

**Rajya Stariya Bal Vaigyanik Pradarshani  
2023-24**

**and**

**51<sup>st</sup> Rashtriya Bal Vaigyanik  
Pradarshani — 2024**

**For the Preparation of Exhibits and Models and  
Organising Exhibition**

## **GUIDELINES**



## important

Besides the popularisation of science, mathematics and environment issues, the objective of organisation of this exhibition at different levels is also to identify and nurture inventive and creative talent among students. Children must be encouraged to explore every resource to enable them to express and handle objects. They must be given all freedom to express their own creativity and imagination. The role of parents, teachers, and peer groups may be in the form of financial support and discussions. **The tendency of procuring the ready-made exhibits or models must be ruled out.** An exhibit must be able to bring out the scientific and mathematical ability of the children, whether the model is traditional or an improvement over the traditional model or innovation. Skills involved in constructing the exhibit or model, the degree of neatness and craftsmanship involved must also be taken into account.



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**Guidelines**

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Organising Exhibition**

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एन सी ई आर टी  
NCERT

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

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## Guidelines For the Preparation of Exhibits and Models

All children are naturally motivated to learn and are capable of learning. The knowledge acquired by them is the outcome of their activity. Children learn through interaction with people and the environment around them. They construct knowledge by connecting new ideas to their existing ideas.

To stimulate creativity, inventiveness and the attitude toward innovation in science and mathematics, NCERT emphasizes on activities, experiments, technological modules, etc. It also encourages the implementation of various activities through a massive expansion of channels such as the organisation of science, mathematics and environment exhibition at the national level for school students, with feeder exhibitions at school/block/tehsil/district/region/state levels.

The National Council of Educational Research and Training (NCERT), New Delhi organises National Science, Mathematics and Environment Exhibition for Children every year to popularising science, mathematics and environmental education amongst children, teachers and the public in general.

In the year 2022, the advisory committee which advised about the science exhibition, in the light of NEP 2020, approved the name of this National Science Exhibition as Rashtriya Bal Vaigyanik Pradarshani (RBVP).

This exhibition is a culmination of various exhibitions organised in the previous year by the States, UTs and

other organisations at the 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, the Department of Atomic Energy Central Schools, Central Board of Secondary Education affiliated Public (independent) Schools, Central Tibetan Schools Administration 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 the district to state level during 2023-24 too. These would form the first phase of preparation for the RBVP to be organised in November 2024. The objectives of the exhibitions are:

- to provide a forum for children to pursue their natural curiosity, creativity, innovation and inventiveness;
- to make children feel that science and mathematics are all around us and we can gain knowledge as well as solve many problems by relating the learning process to the physical and social environment;
- to emphasize the development of science and mathematics as a major instrument for achieving goals of self-reliance, socio-economic and socio-ecological development of the nation and the world;
- to analyse how science and

mathematics has developed and are affected by many diverse individuals, cultures, societies and environments;

- to appreciate the role of science and mathematics in meeting the challenges of life such as climate change, opening new avenues in the areas of agriculture, fertilizer, 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 inspire children to devise innovative ideas towards their prevention and mitigation. Children are naturally inquisitive and innovative in response to a variety of problems confronting society and the world. If today's children get engaged in tackling problems, solving issues, and creating new ideas, we can make our children better prepared for tomorrow's challenges. There is a need to continuously innovate to meet the challenges before us. The rising aspirations of the human community for the desire for more comfort and security have put tremendous pressure on the limited resources of the world leading to unequal access and unsustainable use of resources.

According to United Nations 'Global Resources Outlook 2019', resource extraction has more than tripled since 1970 in the world, including a five-fold increase in the use of non-metallic minerals and a 45 per cent increase in fossil fuel use. Similarly, a very important resource, fresh water is also experiencing acute stress worldwide. According to United Nations World Water Development Report 2019, over 2 billion people live in countries experiencing high water stress, and about 4 billion people experience

severe water scarcity during at least one month of the year. Water has to be treated as a limited resource, with a far stronger focus on managing demand. Climate change and bio-energy demands are also expected to amplify the already complex relationship between world development and water demand. It is true that "Jal hi Jeevan Hai", therefore it is the responsibility of everyone to conserve and manage this very important resource. Keeping in view the importance of water and sanitation the Government of India is increasing the level of investment in this area.

We all are aware that the problems faced by the world today are not confined to a particular city, state or country. Rather, these are global problems and for solving these problems, all the countries of the world need to work in unison. To solve the problems of the world and to bring peace and prosperity to people and the planet, now and into the future, all the member states of the United Nations adopted 'The 2030 Agenda for Sustainable Development' which includes 17 different Sustainable Development Goals (SDGs) along with

169 associated targets. Sustainable development is defined as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This means we cannot continue using the resources at the current level as this will not leave enough for future generations.

The flagship programmes of the Government of India such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Pradhan Mantri Jan Dhan Yojana (PMJDY), Pradhan Mantri Jan Arogya Yojana (Ayushman Bharat), Skill Development, the Swachh Bharat Abhiyaan (Clean India Campaign), Pradhan Mantri Ujjwala Yojana, Beti Bachao Beti Pado (Save the Girl Child, Educate the Girl Child) are some of the steps to achieve these sustainable goals.



Science and Mathematics act as powerful tools for investigating and understanding nature and the world. They also play a crucial role in solving problems confronting society and act as a major instrument for achieving goals of self-reliance and socioeconomic development sustainably. To recognize and encourage these powerful tools so that the problems confronting society can be overcome and a better sustainable future can be built through science and technology-led solutions, **the theme for the Rajya Stariya Bal Vaigyanik Pradarshani — 2023-24 has been chosen as Science and Technology for Society. The theme and sub-themes identified for RBVP 2023- 24 are directly or indirectly focused on achieving the sustainable development goals enunciated by the United Nations.** In this context, it is envisaged that children and teachers would try to analyse all aspects of the role of science and technology in the sustainable development of the world. This will enable students and teachers to generate scientific and mathematical ideas and prepare models/exhibits for addressing various problems. Scientific ideas in this context may be regarding innovative ways of doing things, creating simple technologies/tools that meet new requirements; enabling the participation of the lower pyramid of the population in the development process through science and technology, creating an enabling innovation ecosystem in the country for enhancement of science, technology and mathematics. **However, there are instances when children and their teachers think of some ideas that are new and may be applicable in the future. Often such ideas may not be possible to be presented in the form of a model/exhibit. Organizers of exhibitions at all levels may provide opportunities for students and teacher to present such ideas in the form of presentations and discussions.**

Children and teachers should identify where and how new processes, research, and developments in science, technology and mathematics can bring a better future for the world.

Development of the creative domain of a learner through the teaching-learning process of science is an area which needs to be addressed to make the experience of learning stimulating and exciting. For this, it is necessary to involve students in the acquisition of science topics in creative ways that may aid in their overall growth as learners. With this in view, the theme for the **Rajya Stariya Bal Vaigyanik Pradarshani —2023-24 has been chosen as ‘Science and Technology for Society’.** One cannot fathom life in the present day without science and technology; it is an essential component of day-to-day existence. Science and technology play a wide range of important roles in contemporary society. It expands beyond research and development to play a crucial role in our work, communication, education, health, and other areas. The basis of all scientific discoveries is thought about natural phenomena and what causes them; science is a structured pursuit of knowledge that is motivated by curiosity. On the other hand, the practical use of scientific knowledge to produce useful systems and processes is known as technology. Together, science and technology help us better understand our surroundings and enable us to make more educated decisions based on facts and data. One cannot express enough gratitude for the scientific research and technologies that led to the discovery of the COVID-19 vaccine and other life-saving medications; it was only made possible by advanced medical imaging techniques and other scientific discoveries in this field that we have improved diagnosis, treatment, and patient care. Science and technology play a crucial role in shaping the development of various areas of our

society. It has helped us improve healthcare. Technology has paved the way for digitalization, the internet, and social media. It has also revolutionized communication and connectivity. As a result, sharing scientific knowledge is now simple and open to all. Science also helps to address environmental issues and promote sustainable development. Modern civilization, including every area of our life from healthcare to economics, nation-building, environmental preservation, communication, and automation, is changing as a result of science and technology. It is intended that students and teachers will attempt to analyse all facets of science and technology's function in society from this perspective. This will make it possible for teachers and students to come up with solutions and create models and exhibitions for diverse issues. However, there are instances when children and their teachers think of some ideas that are new and may be applicable in future. Often such ideas may not be possible to be presented in the form of a model/exhibit. Organizers of exhibitions at all levels may provide opportunities for students and teachers to present such ideas in the form of presentations and discussions. The theme for RSBVP-2023-24 and RBVP-2024, is 'SCIENCE AND TECHNOLOGY FOR SOCIETY', and it intends to cover sub-themes like-

1. Health
2. LiFE (Lifestyle for Environment)
3. Agriculture
4. Communication and Transport
5. Computational Thinking

(Sub-themes listed above are suggestive. Students may choose any other sub-themes and develop exhibits involving Science and Technology for Society)

A few exemplar ideas pertaining to the sub-themes listed in the context of the theme, for the development of exhibits are given below.

## 1. Health

Health is a state of complete physical, mental, and social well-being, rather than merely the absence of disease or infirmity. This definition was put forth by the World Health Organization (WHO) in 1948. A person can be called healthy only if his body is disease-free, as well as have no mental stress, enjoys good interpersonal relationships with society and not only an absence of disease. For the individual, there is a certain level of health that everyone can desire to achieve. Health is the foundation that supports every aspect of your life. It allows you to pursue your goals and enjoy experiences that over time life has to offer. Healthy people lead a more successful and productive life. Healthy individuals are key to achieving productivity and economic prosperity.

In addition, a healthy person has a positive interpretation of life, and emotional state and is also capable of stress management. One should always take care of their health, prioritizing your health through balanced lifestyle choices, doing regular exercise, taking a balanced and nutritious diet, avoiding the consumption of junk food and abusive substances like tobacco and alcohol, keeping your surroundings clean and building strong and positive interpersonal connections within your society are all important aspects of leading a healthy life.

Health is broadly affected by genetic disorders, infections and lifestyle but multi-factorial causes are more prevalent in the case of many diseases. In the case of genetic disorders, deficiencies/defects are inherited from parents and the best examples are hemophilia and color blindness, however, diseases like cancer and diabetes mellitus are also known to have a genetic basis, and these are non-infectious. Further, many diseases last for a short period of time called acute diseases like the common cold but many

Other ailments last for longer duration and even as much as a lifetime time like tuberculosis, they are chronic diseases. Cancer is one of the most dreaded chronic diseases of human beings and is a major cause of death all over the globe.

Infectious agents comprise a wide group of organisms called pathogens, they are viruses, bacteria, fungi, protozoan multi-cellular 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. In many instances, the body is able to defend itself from most of these infectious agents through the immune system.

Our health is adversely affected due to many environmental hazards that lead to several kinds of infection in the body. With the increasing population, demand for food, water, home, transport, energy, etc. is increasing causing tremendous pressure on our natural resources and thereby contributing to pollution of air, water and soil. The lifestyle including the food and water we take, the tendency for junk/ fast food, rest and exercise, habits and drugs and alcohol abuse is another challenge to our health. The increasing level of obesity and early detection of hyperglycemia and hypertension is a great cause of worry from a health point of view.

Continuous efforts of scientists, technologists, doctors and naturalists have brought many new ways of safety and security to our lives. Major inventions in bio-medical diagnostics, new vaccines and antibiotics, surgical methods and genetic engineering have given relief to mankind. These efforts are responsible for raising the standard of personal health and hygiene and providing both preventive and curative facilities to the community.

In Sustainable Developmental Goals, Goal 3 “Good Health and Well Being” established by the United Nations in 2015 is made “to ensure healthy lives and promote well-being for all at all ages.”. “India is doing well in achieving SDG Goal 3 by working on path-breaking initiatives like the National Health Mission (NHM), Ayushman Bharat Health Insurance Scheme, National Digital Health Mission and much more.

The main objectives of this sub-theme is: to bring awareness among the children about the factors affecting our health and nutritional needs of the body; to explore new scientific, technological and biomedical inventions in the prevention and cure of diseases like Coronavirus; to explore various scientific and technological interventions for meeting the nutritional requirement of human beings and innovative ideas for better management of the crisis created during COVID-19 pandemic. The exhibits/models in this sub-theme may pertain to:

- Factors affecting the health and resulting ailments in the body;
- To study how cleanliness influences health;
- Foods that improve our immunity to fight against diseases;
- Improved methods and innovative ways of sanitation and appropriate technology for disposal of surgical masks, PPE kits, etc. and other biodegradable and non-biodegradable waste;
- Innovative ideas for effective implementation of policies/programmes/schemes/seminars/workshops such as Swachh Bharat Abhiyan, National Leprosy Eradication Program, educational programmes in schools/colleges about health

etc. that have a significant impact on health;

- Innovative ideas for effective implementation of policies/programmes/ schemes such as Atmanirbhar Bharat (self-reliant India) for making India a bigger part of the global economy.
- Innovative ideas for effective implementation of policies/programmes/ schemes such as Namami Gange and the National Clean Air programme
- Ways to raise awareness about disposing of garbage properly like disposing of them in the separation of dry and wet garbage bins to maintain cleanliness methods to improve rural sanitation; infectious and non-infectious diseases, relationship with causative factors and their sources.
- Mechanisms/ways to control the spread of Coronavirus, Lung infections, Dengue, Malaria, Chikungunya, and other tropical diseases.
- Innovative preventive measures to control diseases at different levels/ roles of various agencies (role of an individual to break the infection spread chain).
- Demonstration and use of traditional methods of medication.
- demonstration of known facts and findings, and health benefits of physical exercise and yoga.
- Demonstrate the importance of a balanced diet and the nutritional values of various food items.
- Ways to raise awareness and sensitize people about the role of social distancing and measures/innovative techniques to overcome issues in its implementation.
- Demonstration of models/projects to show the effect of junk food items and adulterated food items on our body and its preventive measures.
- Demonstration of models/projects to create awareness among children about appropriate rules of safety in hazardous situations to avoid accidents and injuries.
- Presenting medical assistance and facilities for rural/urban areas and gender aspects.
- Development of knowledge-base and understanding of new scientific, and technological aids in biomedical areas.
- Presentation of known facts and research findings in different medical systems like Traditional, Modern, Homeopathy, Ayurveda, etc.
- Lifestyle and its relationship with good and bad health based on known facts and research.
- Common prophylactic measures available for different diseases and advantages of inoculation and vaccination; appropriate measures for family planning and welfare.
- Ideas for developing low-cost, immunity-boosting nutritious food.
- Low-cost medical diagnostic and therapeutic tools;
- Ways to raise awareness and promote mental health and well-being
- Innovative ideas to strengthen the prevention and treatment of substance abuse including harmful use of alcohol.
- Ways to reduce pollution that causes illness from air, water and soil contamination.
- Role of biotechnology to improve the nutritional value of crops.
- Models for sustainable agriculture and health
- Models to demonstrate the impact of chemical residues from fertilizers, pesticides,

hormones and food dyes etc. on health.

- New medical diagnostic and therapeutic tools/ aids for physically handicapped persons for prevention from coronavirus
- Innovative control measures at different levels/ roles of different agencies.
- Innovative ideas/ models for better health of domestic animals. Ideas for effectively implementing policies/ schemes/programmes such as the National Animal Disease Control Programme, Livestock Health and Disease Control Scheme.

## **2. LiFE (Lifestyle for Environment)**

The changing environment and its impact on our lives was never as evident as it is now. Every aspect of our lives is getting affected by the dramatic changes in the environment. Overexploitation of natural resources by humans is the cause of depletion of non-renewable natural resources such as fossil fuels, minerals, etc. We are using natural resources in such a haphazard manner that even water which is a renewable resource is getting polluted and leading to water scarcity in many places across the world. It is even said that the next world war may be fought for water. The world is headed to rapid urbanization and reckless consumerism causing excessive waste generation, and polluting land, soil, air and water.

Refrigerators, transportation and chemical industries are major contributors to air pollution and emissions of greenhouse gases and depletion of stratospheric ozone. Our unsustainable practices are not only responsible for endangering the future of our coming generations but impacting other life forms on the planet. Unsustainable agriculture contributes to deforestation, habitat destruction, soil degradation and ultimately loss of biodiversity.

We do not have enough space anymore to dispose of the mountains of waste that we generate each day. A huge chunk of the waste also gets dumped into the ocean leading to ocean pollution thereby causing severe threats to marine life and the ecosystem.

While resources are depleting, our consumption is increasing. Therefore, the gap between what is available and what we need is increasing. This gap has to be reduced if we want to sustain life on this planet. A sustainable lifestyle is no longer an option but a necessity to minimize the negative impacts on the environment and maintain a balance between human needs and the well-being of the planet. A sustainable lifestyle is a lifestyle for the environment and includes practices like, (i)reducing energy consumption by using energy-efficient appliances and lighting, minimizing the use of fossil fuels by choosing appropriate means of transport and switching to renewable energy sources like solar energy, (ii)Conserving water by being mindful about our water usage in daily activities, (iii) Minimizing waste by adapting the 3R (Reduce, Reuse and Recycle) of a sustainable lifestyle. We should reduce our consumption and use only according to our needs. We should reuse items as much as possible like using plastic containers and cardboard boxes to store, we can also donate our old clothes to needy ones instead of dumping them. And we should recycle items like newspapers, bottles, tin, glass, etc., which are used as raw materials for manufacturing other items. Recycling reduces the load of extracting more from our natural resources and at the same time, it reduces waste by not letting it go to the landfills.

Incorporating sustainable practices into our daily life requires commitment towards the environment. Making conscious choices that align with the well-being of both people and the planet is the need of the hour and essential for future generations. Such mass movement towards mindful and deliberate utilization is what is Lifestyle for the Environment (LiFE)

all about. Educating people about LiFE should also be the agenda for all concerned stakeholders to create a sustainable future for all.

Keeping this in view, students can come up with innovative strategies by applying their scientific knowledge. They can identify an issue and suggest innovative ways to solve the problem through a model/ project. Students are encouraged to choose an issue which is locally relevant. There is a wide range of projects which students may consider. Some areas in which students can develop their projects are listed below:

- Green or renewable energy from solar, wind, water, etc.
- Reducing air, water and soil pollution in rural and urban environments; agriculture, industries, manufacturing and transport sectors, etc.
- Reclamation of riverbanks and flood-affected areas for the rehabilitation of landless people
- Automatic weather-recording devices
- Devices or models to calculate the carbon footprint of an individual or a family.
- Innovative designs and technologies for solid waste management
- Eco-friendly home design featuring the use of energy-efficient appliances and renewable energy resources
- Model on the difference between urban and rural life in terms of sustainability and consumption of resources.
- Water harvesting and groundwater recharging
- Management of coastal areas  
Reducing carbon and ecological footprint
- Drainage systems
- Green buildings
- Sustainable, biodegradable and innovative ways of packaging
- Sustainable and eco-friendly cooling and heating systems in appliances, buildings, etc.
- Biodegradable and cost-effective products
- Restoration and conservation of biodiversity—terrestrial and aquatic (freshwater and marine)
- Human susceptibility to infectious diseases through malnutrition due to climate stress and ways to control them/ studies of the impact of global warming on human health (spread of epidemics like dengue, malaria, zika virus, SARS CoV-2, etc.)
- Innovative ideas to reduce waste in the extraction and processing of minerals
- Innovative designs to address human-animal conflict
- Social conflicts resulting from the environment and climate change and their resolution (if possible, using case studies)
- Innovative designs/ methods of wastewater recycling/ reclamation/using recycled water in industries/ homes
- Innovative technologies/designs of sanitation/hygiene-related issues
- Innovative designs for enhancing efficiencies of existing lighting systems/ automobiles/machines/ stoves/ *chulhas*
- Innovative devices for various purposes like measurement of pollutants, detecting forest fires, recording weather, diseases, etc.
- Conservation and management strategies for biodiversity
- Conservation and management strategies for forests, lakes, rivers, mangroves, wetlands, peatlands, etc.

- Technologies for forecasting and warning of cyclones, floods and storms
- Mathematical modelling to address the impact of environmental degradation and climate change on biodiversity
- Mathematical modelling to address the impact of the increase in population on the environment
- Mathematical modelling to address the spread of forest fire depending on the types of trees, weather and nature of the ground surface, etc.

### 3. Agriculture

The backbone of the Indian economy, agriculture is a practice that has been practiced for a thousand years and is deeply ingrained in Indian culture. In 2022–2023, agriculture and related sectors contributed about 18.3% to the GDP; it is the oldest and fastest-growing sector in India and supports about 151 million people. For Indians, agriculture is not simply a source of income but also a way of life. Approximately 60% of Indians are either directly or indirectly involved in agricultural pursuits. India is the second-largest producer of wheat, rice, sugarcane, vegetables, groundnuts, cotton, and fruit in the world because agriculture is the only sector that also produces raw ingredients for other industries. In addition, India is the biggest producer of spices, jute, and pulses in the world. The main reason other industries in India are thriving, including textile, food processing, and pharmaceutical manufacturing, is the simple accessibility to raw materials. Since the Indus Valley civilization in antiquity, India's ecology, varied climate, and topography have made a broad variety of crops possible to grow. Numerous other crops, including pulses and millets, are grown throughout India, including wheat and sugarcane in the northern plains, rice in the south, cotton and jute in the

western Ganga delta, and many others. Indian soil is fertile and rich in nutrients, making it ideal for growing cash crops like spices, tea, and coffee that support the nation's export revenue.

We can argue that science and technology have created a symbiotic connection with agriculture, revolutionizing the way we produce food, manage resources, and maintain ecosystems. This is true when discussing the growth of agriculture in our country. The Green Revolution of the 1960s is the best example of how ground-breaking innovations have repeatedly changed the agriculture sector. Science continues to enable the development of new crops through the genetic engineering of commercial crops and the use of breeding techniques to improve a variety of staple crops. These techniques are also to thank for the increased resistance of various crops to pests and diseases as well as their improved nutritional values. Sustainable agriculture approaches have been influenced by scientific understanding of soil chemistry, microbiology, and ecology to maximize fertilizer utilization, lessen soil erosion, and preserve biodiversity. Technology in agriculture has made farmers less reliant on traditional farming methods and less reliant on monsoon patterns and climate change. We now have new and improved irrigation and ploughing equipment, as well as technologies that can predict weather patterns, which can help us plan and successfully harvest crops with the least amount of loss. Research and development in areas like plant physiology, plant stress responses, and the nutritional profile of soil aid in the selection of crops appropriate for the season and the use of fewer pesticides and chemicals than would otherwise be necessary. Despite all the advantages of science and technology in agriculture, there are some drawbacks as well. For example, the use of pesticides and insecticides is a major

contributor to soil degradation and pollution, and feeding a large population with scarce resources also puts a strain on the ability to grow more food on the fertile land. Environmental concerns are not the only concern the main challenges in the agriculture sector are the ethical issues surrounding genetically modified organisms (in this case crops) and corporate businesses' control over seeds. To achieve ethically sound and equally sustainable agricultural techniques, we must strike a balance between technological innovation and ethical concern.

Goal two of the United Nations' Sustainable Development Agenda (SDG-2) is to "end hunger, achieve food security, and improve nutrition to promote sustainable agriculture." SDG Goal 2 calls for "zero hunger" in all forms by 2030 to promote sustainable development. The goal includes the challenge of providing wholesome food to everyone and everywhere so they can have healthy lives. Sustainable agriculture must be promoted and made widely known to accomplish this goal. To raise awareness and promote millet production and consumption, the United Nations has designated 2023 as the International Year of Millets.

With this sub-theme, we hope to encourage children from rural areas whose families are involved in farming to identify problems with the current situation and to find solutions using their knowledge and the assistance of teachers. The goal of this sub-theme is to assist students in finding solutions to conventional agricultural practices. We want students to identify long-term fixes for issues that farmers confront. They can see a problem and offer creative solutions by way of a model or project. Students are urged to select a problem that has local significance. There are numerous projects that students can pick from. The following is a list of several areas where students can build their projects:

- Role of biotechnology in enhancing crops' nutrient content and stress tolerance.
- Innovative approaches show how farmers can improve resource use using technologies like GPS, sensors, and data analytics.
- Creating tools or applications to gather weather data that farmers can use to schedule irrigation, harvesting, and ploughing.
- Creating tools to help with irrigation automation.
- Creating tools to gather information about the soil and topography of the area to make informed decisions before each crop season, such as if the soil is deficient in a specific nutrient needed for one crop, sowing another crop or leaving the ground unplanted to obtain the nutrition.
- Utilizing a model to illustrate the advantages of modern agricultural practices such as hydroponics and how they apply to that particular area.
- Showing off how to grow crops using new and existing genetic modification techniques for plants and crops.
- Demonstrating the breeding and selection process for agricultural types that are climatically adaptable.
- Current bread or crops that have undergone genetic engineering and their evolution throughout time. Students can give examples of modern crops in this area, compare them to earlier varieties, and discuss how technological advancements have influenced agricultural evolution.
- Build a model of the intelligent watering system.
- Create a model to demonstrate



how trap crops or the introduction of beneficial insects, such as earthworms, can be used to control pests without the need for a lot of pesticides.

- Create a smartphone application that can inform farmers about the type of soil, its chemistry, and the crops that can be grown there given the local climate and soil conditions.
- Give an example of how agricultural waste can be converted into bioenergy using techniques like anaerobic digestion.
- Create a model for using agricultural waste to create other beneficial materials, such as bio-oil, paper, compost, etc. Students should also emphasize how this can aid in sustainable energy production, trash management, and carbon footprint reduction.
- Suggest ways to combine several techniques, such as aquaponics (fish farming) or apiculture (bee farming), and explain how doing so might benefit farmers.
- Create or offer a model for novel irrigation techniques, such as drip irrigation, and their advantages over more conventional techniques.
- Create a model that tracks the health and development of crops using sensors and remote sensing methods.
- Best circumstances for fern growth and mushroom production.
- POSHAN Abhiyan, a targeted public distribution system for food grains to the underprivileged, is one example of a policy, program, or scheme that can be effectively and transparently implemented by using fair-priced stores.

- Effective methods for using biological insecticides, biological fertilizers, biological manures, biological weedicides, etc. to boost crop growth and yield.

- Innovative methods for growing fodder crops alongside the maincrops to improve the nutritional value of the feed for farm animals.

- Innovative strategies for putting policies, programs, and plans into action that will improve millets' productivity and consumption in time for the International Millet Year in 2023.

#### **4. Communication and Transport**

The dream of the modern world is a reality today only because of communication and transport; these are the two pillars upon which the modern world rests. One could never imagine the world as we know it today without communication and transport; they have facilitated the exchange of ideas, goods, and culture across vast distances. The evolution of communication and transport is the basis of globalization; it has given a fast pace to development and played an important role in transforming societies, economies, and lifestyles in profound ways.

In ancient times, people used symbols for communication, which led to the discovery of language and made sharing thoughts, ideas, and learning possible. Today, the digital revolution has catapulted communication to unprecedented levels. The Internet has changed the world overnight due to new platforms like social media and messaging apps, which have shrunk the globe. Now anyone can interact with their families, friends, or complete strangers sitting in different corners of the world. Digitalization in communication has removed all geographical

barriers between individuals. This has not only democratized access to information but has also generated a global sense of unity and shared responsibility. All of this contributes to effective and transparent communication, which acts as the foundation for successful relationships, both personal and professional, helping to build international relations, prevent misunderstandings, and promote cooperation. Transport, on the other hand, is the physical movement of people, goods, and services from one place to another. In ancient times, people used to travel by road, either by walking or using an animal cart for trading; these routes were the means of exchanging goods, ideas, and culture between different civilizations. With the industrial revolution came advancements in transportation technology, which gave us railways, steam engines, and steamships, which accelerated the movement of goods and people over large distances. In the modern world, technology has further revolutionized our modes of transport; now we have air travel and a shipping network as well, which has transformed the concept of time and distance drastically. All of these advancements in modes of transport have boosted the world economy by enabling the exchange of resources and fostering interconnectivity.

Science and technology have played a dynamic role in the advancement of communication and transport; they have played an instrumental role in enhancing efficiency, connectivity, and global outreach. The inventions of telephones and radios are the basis for modern communication systems. The internet, without which we cannot imagine our world today, has become the backbone of contemporary communication. In the case of transportation, we are travelling in high-speed trains and electrical vehicles today instead of horses or bullock carts, and it was made possible only because of science and technology

advancements. We have reached the moon and have artificial satellite technologies available to us only due to the efforts of aeronautical engineers and space scientists.

Furthermore, communication and transport, along with science and technology, are different threads woven together to form the fabric of development and growth for any nation. Advances in communication have improved the management and coordination of transportation networks. Real-time tracking, monitoring, and predictive analytics have optimized the movement of goods, and enhanced traffic management has ensured the safety of travellers. New communication technologies like artificial intelligence (AI) are contributing to making the dream of smart cities a possible reality where vehicles, infrastructure, and information are seamlessly interconnected.

While there are many benefits of science and technology in the fields of communication and transport, they also pose ethical considerations like data privacy, cybersecurity, misuse of advanced technologies, fear of job displacement by AI in automated transport systems, ethical implications of decisions made by AI-driven vehicles, etc. Hence, it is our responsibility to ensure that the benefits of these advancements are harnessed for the betterment of humanity. The objectives of this sub-theme are to make the general public and children understand different modes of communication and transport as well as the importance of communication and transport for sustainable development; to make them aware of the issues and concerns of the present communication and transport systems; and to promote innovations for efficient systems.

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

- Improvised or indigenous models for efficient transport or communication.
- Working models of fuel-efficient or pollution-free designs of automobiles, ships, boats, etc.;
- Innovative ideas for efficient management of road, rail, water, and air transport systems, e.g., better safety measures, managing traffic jams, etc.;
- Improvised or improved devices for effective transport between various emergency services, namely medical, police, military, and other administrative bodies;
- Use of geostationary satellites in providing information about vehicular movements and transportation, disaster management, etc.;
- Designs for improving existing transport and communication systems. Innovative ways of using modern modes of communication or transportation to connect people.
- Develop a mathematical model that stimulates traffic flow in a city. In this course, students can use concepts from fluid dynamics and calculus to model the movement of vehicles.
- Develop a model of how different transport technologies work, for example, how GPS uses satellite signals to determine an object's position.
- Design a model to demonstrate how electromagnetic waves propagate and how they are used in communication with the help of concepts like modulation, encoding, and signal amplification.
- Prepare a model of how optic fiber works, its uses in communication, and the future possibilities of its use.
- Explain the concepts of viral on social media. how social media networks work and how their algorithms work to trend memes, news, and articles. Students can use graphs to
- present nodes and connections to present network dynamics. Discuss the implications of social media networks on communication and social behavior.
- Develop a mathematical model to show how air routes and other parameters are designed for airplanes to optimize the shortest distance for travel. Students are encouraged to discuss the use of any new proposed technology for air traffic management and the role of communication in this regard.
- Suggest new and effective methods to optimize logistics and supply chain routes for goods transportation.
- Develop a model to show the Doppler effect and its application in radar systems. Show how changes in frequency due to motion detect the speed and direction of objects. Discuss its application.
- Develop a model to show how encryption and decryption in digital communication help with cyber security.
- Demonstrate a model of how smoke signals were used in communication and their impact on the air quality index, link it with modern-day air quality, and discuss whether modern-day communication signals are pollution-free or not.

## 5. Computational Thinking

It is difficult to thrive in the technologically advanced, highly complex society we live in today. For today's generation, having the capacity to think critically, solve problems, and make wise judgments is crucial. Computational thinking is a way of problem-solving that extends beyond coding and programming to solve logical

issues. It is based on the ideas of computer science. It has made it possible for people to analyse problems, come up with effective solutions, and use these abilities across various fields.

With its cognitive abilities derived from computer science ideas, computational thinking is frequently employed to address contemporary issues. It is essentially supported by four major pillars: A) Decomposition: Dividing difficult issues into more manageable parts by concentrating on and thoroughly comprehending each component in this step, we are able to combine them to create a holistic answer. B) Pattern Recognition: In this method, the problem is examined for any discernible patterns and trends that may be compared with various scenarios to identify and implement solutions that have previously been successful for a problem of a similar nature. C) Abstraction: Reducing the issue to its core elements while omitting superfluous details. Abstractions aid in concentration and simplify solutions, making them simpler to understand and solve. D) Algorithm Design: This entails developing detailed instructions or algorithms to address a challenge. This entails rationally ordering the steps to provide efficient and successful solutions.

Numerous disciplines, including business, healthcare, the arts, and the sciences, have greatly benefited from the use of computational thinking. Computational thinking has a wide range of applications;

In business and economics, it has been used to evaluate market trends, improve supply chains, and make data-driven decisions in an effort to increase profits, lower costs, and improve efficiency. With the use of computational thinking, medical personnel can now diagnose diseases more quickly, analyse patient data, and create treatment plans. Large datasets can be analysed using computational thinking, which enables quick decision-

making in urgent situations. For artists and innovators, computational thinking has opened up an entirely new universe in a variety of emerging fields like graphic design, animation, and architecture, all of which were made possible by computational thinking alone and are now thriving. It plays a crucial part in providing educators and teachers with new resources and instructional strategies to improve learning. It has aided in developing flexible learning environments and individualised instruction for students with various requirements.

The proliferation of data and knowledge brought on by the digital revolution presents both benefits and difficulties. Computational thinking is used in many fields, like data analysis, that seems unachievable without it. For data scientists and analysts who work with massive datasets, computational thinking is crucial. The development of algorithms and models using artificial intelligence (AI) and machine learning is based on the same fundamental ideas, leading to a holistic approach to problem-solving. Computational thinking is also necessary for understanding vulnerabilities, creating secure systems, and efficiently responding to breaches in the field of cybersecurity.

We are attempting to highlight the value of computational thinking for the present and the future. In this subtheme. With this subtheme, we want students to create models or exhibits that represent the significance of computational thinking for the modern world and how it can be advantageous for society. By introducing computational thinking early in education, students can develop problem-solving skills that transcend specific subjects. and with this subtheme we want students to make models/exhibit that represents the importance of computational thinking for the modern world and how it can be beneficial for society.

The exhibits and models in this sub-theme could be related to:

- Design a model for traffic simulation in a city and propose a way to use computational thinking in it.
- Building a model to show the use of computational thinking in managing individual and company finances to achieve their financial goals.
- Develop a model or exhibit to show an artificial ecosystem where species interact with each other based on algorithms. Here students must show the design of the algorithm by using computational thinking and can also involve the balance and adaption in the parameters for algorithm design.
- Develop a model on the use of computational thinking in different areas like healthcare, education, economy, business, entertainment, art etc. Students may choose one of these topics and explain in detail the use of computational thinking in each field.
- Develop a model to create digital stories with the help of computational thinking.
- Develop a model to show how computational thinking can be used at time of natural disasters such as floods and earthquakes by providing a solution based on comparing different scenarios and response strategies.
- Develop a model to show how computational thinking can be used to present evolution through changes in the genetic makeup of a species and calculate the rate of mutation and future of that species using computation thinking.
- Develop a model to show the use of computational thinking at the time of the pandemic and how it can provide solutions and strategies to fight such situations



## Guidelines For Organising One-Day Seminar

### **Topic: Millets for Health and Sustainable Planet**

*NOTE: The One-Day Seminar should preferably be organised one day before the organisation of Rajya Stariya Bal Vaigyanik Pradarshani (RSBVP) for Children.*

Providing nutrition and food security to the growing population is the biggest challenge faced by various countries around the world. The changing environment and increased population rate have worsened the situation further, and in such adversity, millets have emerged as a ray of hope. The Food and Agriculture Organization of the United Nations General Assembly at its 75th session has declared 2023 as the international year of millets, as proposed by India in 2018. Millets are a group of small-seeded grasses widely grown in many parts of the world for human and animal consumption and known for their resilient nature to grow in diverse climate conditions and nutritional benefits. In India, millets are known as “Mota Anaj,” and various varieties of millets like Ragi (finger millet), Bajra (pearl millet), Kuttu (buckwheat millet), Jowar (sorghum millet), Oodalu (barnyard millet), Kutki (little millet), Varagu (kodo millet), Kangni (foxtail millet), etc. are grown in different parts of the country. Millets are versatile crops that can be grown in very harsh environments with minimal water and other requirements. Millets does not require any use of fertilizers and pesticides as they are resistant to various environmental and nutritional stress conditions, thus contributing to decreasing soil and water pollution due to excessive use of fertilizers and pesticides. Millets farming also contributes to biodiversity by eliminating monoculture practices. Millets’ use of fewer resources than other crops like wheat and rice makes them an economically favorable and environmentally sustainable crop.

In recent times, there has been a growth in various lifestyle diseases like diabetes, thyroid disease, syndromes of the female reproductive system, obesity, and high cholesterol levels. The root cause of all these diseases is linked to the food we are consuming, and thus demand for a healthier diet option is increasing. Millet is a wholegrain, an excellent source of nutrition, and high in dietary fiber, vitamins, and minerals. The nutritional benefits of millet are making it a top choice for people in high-income countries who are looking for healthy and nutritious diet alternatives for major cereal crops like rice and wheat. The nutritional composition of millet helps manage various aspects of human health, for example. Millets are rich in dietary fiber, which improves digestion. Many varieties of millet have a low glycemic index, which means they do not result in a sudden spike in blood sugar levels, and their breakdown takes time in digestion and thus causes the gradual release of sugar in the blood stream. Foods with a lower glycemic index are beneficial for people with diabetes. Millets are a rich source of potassium, phosphorus, magnesium, and calcium that keep our hearts and bones healthy. Millets are also gluten-free and are suitable for people with gluten sensitivity. Millets are complex carbohydrates; their digestion in our body is slow, so they provide us with energy for a longer duration in comparison to traditional grains like rice and wheat. Millets, with all their nutritional benefits are the best choice for people with or without any disease. They help in body weight management, improve heart and bone health, act as an energy booster,

and are generally considered non-allergenic. Therefore, including millet in our diet can contribute to improved health and well-being. Considering the low cost of producing millets, their capacity to withstand diverse environmental conditions, nutritional benefits, and high demand make them an ideal grain for sustainable development. Promoting millet cultivation can create opportunities for farmers. Many small farmers can start millet cultivation, as it requires very few inputs and can be done on a small scale. Millet cultivation can serve as a tool for income generation and poverty reduction. Connecting small farmers from rural areas, especially those living in extreme ecological zones, to the nation's development and economy can be highly beneficial. Millet production will also lessen the dependence on other crops for consumption and promote the diversification of food in the diet. A diverse food system ensures that communities are not entirely dependent on a single crop, thereby enhancing food security. Millet cultivation can also promote cultural preservation; millets have been grown in India or other parts of the world since ancient times and consumed for generations by diverse cultures. Over time, communities from different cultures have developed different agricultural practices; their recipes and cooking styles also differ from one another. Millet production requires very few extrinsic resources and thus promotes traditional agricultural practices and cultural sustainability. In conclusion, millet can be very useful for sustainable development; its ecological resilience, rich nutritional values, economic potential, and cultural significance, make it a crop for present and future development. It can provide a way to reduce our ecological carbon footprint by using fewer resources; it can promote underdeveloped countries with less or no natural resources required for producing other crops like wheat, rice, and pulses to find modes of income generation and to contribute to the world economy.

Keeping above in consideration, we intend to create awareness among teachers, educators, researchers and students about the importance of millet for health and a sustainable planet. As a part of this endeavor a one-day seminar may be organized during the Rajya Stariya Bal Vaigyanik Pradarshani (RSBVP) 2023-24. During this One-Day Seminar on "Millets for health and sustainable planet", children, teachers, teacher educators and all concerned may be invited to generate ideas. The activities in this seminar may include

- Making people aware of importance of Millets and its various use.
- Organizing quiz competition based on advantages of millets for health and sustainable planet.
- Organising invited talks by experts in this field
- Letting students to take initiative to propose benefits of millets as a crop for sustainable future.
- Organising oral presentation of any innovative or exemplar work related to the theme of one day seminar.
- Encourage participants for an open house discussion on millets and related topic.
- Spreading awareness about the history of millets in India and world.



## Guidelines For organising Rajya Stariya Bal Vaigyanik Pradarshani 2023-24

### A. Call For Entries

1. The theme for Rajya Stariya Bal Vaigyanik Pradarshani (RSBVP) 2023-24 for Children and for the 51<sup>st</sup> Rashtriya Bal Vaigyanik Pradarshani (RBVP- 2024) for children would be **“Science and Technology for Society”** pertaining to the sub-themes such as –
  1. Health
  2. LiFE (Lifestyle for Environment);
  3. Agriculture;
  4. Communication and Transport;
  5. Computational Thinking;

(Sub-themes listed above are suggestive. Students are free to choose any other sub-themes and develop exhibits involving innovations in Science and Technology for Society).

2. In order to facilitate the preparation of exhibits and models for display in district to state-level exhibitions during 2023–2024 *Guidelines for the Preparation of Exhibits and Models* are being communicated.
3. Wide publicity should be given for inviting entries. *RSBVP–2023 – 24 Guidelines for the Preparation of Exhibits and Models should be provided to all schools*. These guidelines may also be translated into local languages and be given wide publicity. This may also be given on the 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 ideas and for developing exhibits and models. These guidelines can also be downloaded from the NCERT website ([www.ncert.nic.in](http://www.ncert.nic.in)).

4. 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, Navyug, Municipality, Bhartiya Vidya Bhavan, Science Clubs etc.] are eligible to participate in State Level Exhibitions. Preference may be given to students in senior classes (i.e., secondary and higher secondary stages).

#### **Note: For State/UT Coordinator:**

Following organisations conduct their own exhibitions separately:

- Kendriya Vidyalaya Sangathan;
- Navodaya Vidyalaya Samiti;
- Department of Atomic Energy Central Schools;
- Central Tibetan Schools Administration;
- 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 Rashtriya Bal Vaigyanik Pradarshani (RBVP) for Children to NCERT directly. Therefore, it may please be ensured that entries belonging to these organisations are not forwarded to NCERT by States/UTs.

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

### **B. Screening, evaluation and Monitoring of entries for RSBVP**

1. In case Districts/Regional Level Exhibitions are not being organised by the State/UT, a Screening
2. Committee should be set up to finalise the selection of entries from various institutions for participation in the Rajya Stariya Bal Vaigyanik Pradarshani (RSBVP) for Children.
3. The Screening Committee may consist of representatives of SISE/SIE/SCERT 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 a good finish and are presentable.
4. The above-mentioned Screening Committee or a separate panel of judges should evaluate the exhibits according to the criteria of evaluation as mentioned for RSBVP.

5. Best three exhibits in each sub-theme should be selected; preferably developed by secondary and higher secondary students; by the said panel of judges. However, an outstanding exhibit developed by upper primary students and members of science clubs may also be considered if the said panel of judges feel so.
6. A list of the selected entries of the exhibits and models under each sub-theme (to be displayed in the state-level exhibition) must be prepared. This must contain the name of the exhibit/model, names of the student(s) and guiding teacher(s), the name of the school and a piece of brief information about the exhibit (maybe in two sentences only).

Such a list may be prepared in accordance with the NCERT's unpriced publication "List of Exhibits", 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, New Delhi. 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.

### **Criteria For evaluation of exhibits in RSBVP**

In order to keep 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 are suggested (the percentages given in bracket are suggestive weight-ages):

1. Involvement of children's own creativity and imagination (20 per cent);

2. Originality and scientific and mathematical 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 for Society, scalability (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).
- (i) **5% extra weightage may be given to exhibits from rural/backward regions.**
- (ii) **3% extra weightage may be given to exhibits from semi-urban regions.**

On the basis of the criteria suggested above and also as mentioned in proforma VI, three entries from each sub–theme developed by students of classes IX–XII may be selected and forwarded to NCERT for consideration for participation in RBVP–2024. However outstanding exhibits developed by upper primary students and members of science clubs may also be considered provided the total entries from each sub–theme does not exceed three.

**In addition to this, two best exhibits developed by disabled students from any of the sub– themes may also be forwarded to NCERT. It must be kept in mind that entries submitted under this category should be displayed only by disabled students. Further, the entries forwarded should be accompanied by a disability certificate from a competent authority. Disability norms followed by the government of India will be**

**considered under this category. (Note: There are instances when children and their teachers think of some ideas that are new and may be applicable in future. Often such ideas may not be possible to be presented in the form of a model/exhibit. Organizers of exhibitions at all levels may provide opportunities to students and teachers to present such ideas in the form of presentations and discussions. RSBVP Coordinators may forward two such innovative ideas written in a few paragraphs to NCERT; or consideration for participation in the National Exhibition.)**

Judges are also requested to judge whether the model is traditional or an improvement over the traditional model or it is an innovation as per proforma IV.

Various skills are 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 ready-made exhibits/models. The general layout of the exhibit, relevance, clarity of charts accompanying the exhibit and overall attractiveness to the masses and children should also be assessed. Working models should be encouraged.

### **C. Expenditure Norms**

The ‘Grant-in-Aid’ provided by NCERT to respective states/UTs is a **catalytic grant** for organising State Level Exhibitions and a one-day Seminar. 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 forms of payment may be followed

## 1. For Organising One-Day Seminar

- (i) The seminar should be organised one day before the organisation of RSBVP or during the days of the exhibition in the morning/evening hours
- (ii) Honorarium to four experts/scientists may be disbursed at the rate of `2500.00/- each.  
*Note: The expert/scientist should be preferably from a research institute/laboratory/university/SCERT/SIE.*
- (iii) Daily allowance and conveyance charges to experts/scientists may be disbursed as per state/central government rules.
- (iv) Contingency grant for tea/coffee with light snacks: typing/ photocopying/ cost of transparencies/ pens/ printing of banners/ stationery etc.: up to `20,000.00/-.

## 2. For Organising the RSBVP

- (i) Honorarium to ten **judges** may be disbursed at the rate of `2500.00/- each. **NCERT faculty members should not be provided with 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 in each exhibit. Even if more than one exhibit is selected from a single school, only one teacher from that school may be allowed to participate.
- (iii) Travelling allowance: actual second-class sleeper rail/ bus (non-AC) fare.
- (iv) Participants may be provided incidental charges maximum up to 400.00/- for

for to and fro journeys by rail or bus, provided the journey time is more than 6 hours for journeys less than 6 hours no incidental charges should be paid.

- (v) Boarding expenses: `200.00/- per head per day for each participant for a maximum of 4 days. *In case the boarding facilities are not provided by the organisers, a sum of `300.00 per person per day may be provided.*
- (vi) Local conveyance charges may be disbursed as per state/central government rules.
- (vii) Contingency grant for typing/ photocopying, the printing of publicity materials, exhibition material, banners, stationery etc. up to 50,000.00/-

## D. Maintenance of Accounts

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 conclusion of the exhibition** for adjustment in the NCERT account. Proforma V is given for convenience. All vouchers may be signed by the Coordinator/In-charge of the exhibition. All those vouchers/receipts that are in the regional language should accompany a translated copy in English certified by the Coordinator/In-charge of the State Level Exhibition to facilitate the audit and settlement of accounts. All payments exceeding `5000.00/- should be supported by the payee's receipt with a revenue stamp. It may 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 and Seal of the Coordinator/  
In charge. Rajya Stariya Bal Vaigyanik  
Pradarshani for children-2023-24

**Note:** *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.*

#### **E. Reports of RSBVP to be sent to NCERT**

A formal report of the Rajya Stariya Bal Vaigyanik Pradarshani for children-2023-24 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 the 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
- iv. female participants should also be given. It should also reflect on the number of rural and urban schools that participated in the exhibition.
- v. List of entries of the exhibits and models being displayed in the state- level exhibition. The number of exhibits displayed under each sub-theme should also be mentioned separately.

vi. Highlights of the exhibition include other activities such as lectures, film shows, book exhibitions etc. and participation of other scientific/ industrial organisations.

vii. Panel of judges for evaluating the exhibits/models displayed in the exhibition (in accordance with the Criteria for Evaluation of Exhibits).

viii. List of selected exhibits being sent for consideration for participation in 50th RBVP-2023 bearing the name of the

ix. student, teacher, school, complete write-up of exhibits, 5

x. minutes video presentation in CD about the exhibit by the student, etc. If the video is in the regional language, it is expected to make it, in Hindi/English also for wider publicity among the students and teachers. (A proforma for information about the exhibit/model is also attached for this purpose Proforma I).

xi. Number of visitors to the exhibition.

#### **F. Criteria for Evaluation of Exhibits for Rashtriya Bal Vaigyanik Pradarshanin (RBVP) For Children**

Selected entries from all Rajya Stariya Bal Vaigyanik Pradarshani, (RSBVP) for children organised in different states, union territories and other organisations are forwarded to NCERT for consideration for participation in Rashtriya Bal Vaigyanik Pradarshani, (RBVP) for Children. RBVP is organised every year by NCERT in a state/union territory on a rotation basis. These entries are forwarded to NCERT as per Proforma I (given in this booklet). At NCERT, these entries are screened and shortlisted on the basis

of their write-ups and a 5 minutes video presentation on CD by the student. For this purpose, the following criteria for evaluating exhibits are adopted (the percentages given in the bracket are weightages). NCERT reserves the right to alter the criteria to include adequate

The number of exhibits from rural/backward regions and exhibits developed by disabled students.

1. Originality and innovations in the exhibit/model (25 per cent);
2. Scientific thought/principle/approach (20 per cent);
3. Utility for Society, Scalability; (20 per cent)
4. Economic (low cost), portability, durability, etc. (15 per cent); and
5. Presentation of write-up:(20 per cent). meeting may be conducted for five days for a given time slot from 9:30 AM to 6:00 PM. All participating students must log in to this common platform and showcase their exhibits. Participating students must remain present online for further interaction with the visiting students/persons.

**3. Interaction of Students:** There must be scope for children/persons to visit various exhibits under various sub-themes and interact with the participating students regarding their queries about the exhibits.

**4. Uploading the Selected Videos:** All the selected exhibits may be displayed through pre-developed videos provided by participating students and teachers. There must be a scope on the portal for displaying the event as a live telecast and video may remain uploaded even after the given time slot.

**5. Other Activities of the Event:** Popular lecture is one of the key features of the exhibition and may be conducted through a webinar using the live platform in the given time slot during the event.

**6. Network Issues:** In the situation of network issues in Rural and interior areas, students may be allowed to send the recorded videos in the form of CD/DVD to respective coordinators/in charge at the district level, from where it can be uploaded by the district coordinators on the platform if required, it is suggested that the participating students along with their teachers may participate the event from block/district level city where there is no network issue following SOP released by the government of India.

7. The catalytic grant given to the state if required can be used for **website creation/technical support for the conduct of the exhibition.**

#### **G. Suggestion on conducting an online Exhibition**

In unavoidable circumstances such as in the case of a global pandemic or regional endemic or occurrence of a natural/man-made disaster (fire breakdown, flood, earthquake etc.) the State officials are suggested to start the organisation of science exhibitions in an online mode beginning from block level to State level. It is suggested to encourage a maximum number of students to participate in these exhibitions and display their models in online mode wherever possible. Wherever these exhibitions are conducted in an offline mode the programme may be conducted using the following Guidelines

1. **Development of a Portal:** A portal may be designed where all types of information related to the science exhibition may be displayed so that everyone will have access to all the information related to the exhibition.
2. **Using an Online Platform:** To conduct the programme in online mode several available resources such as various online platforms may be used. The meeting may be conducted for five days for a given time slot from 9:30 AM to 6:00 PM. All participating students must log in to this common platform and showcase their exhibits. Participating students must remain present online for further interaction with the visiting students/persons.
3. **Interaction of Students:** There must be scope for children/persons to visit various exhibits under various sub-themes and interact with the participating students regarding their queries about the exhibits.
4. **Uploading the Selected Videos:** All the selected exhibits may be displayed through pre-developed videos provided by participating students and teachers. There must be a scope on the portal for displaying the event as a live telecast and video may remain uploaded even after the given time slot.
5. **Other Activities of the Event:** Popular lecture is one of the key features of the exhibition and may be conducted through a webinar using the live platform in the given time slot during the event.
6. **Network Issues:** In the situation of network issues in Rural and interior areas, students may be allowed to send the recorded videos in the form of CD/DVD to respective coordinators/in charge at the district level, from where it can be uploaded by the district coordinators on the platform if required, it is suggested that the participating students along with their teachers may participate the event from block/district level city where there is no network issue
7. The catalytic grant given to the state if required can be used for **website creation/technical support for the conduct of 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:

**Prof. T.P. Sarma**

*Coordinator*

**Rajya Stariya Bal Vaigyanik Pradarshani, (RSBVP) for  
Children - 2023-24**

**DEPARTMENT OF EDUCATION IN SCIENCE AND  
MATHEMATICS NATIONAL COUNCIL OF EDUCATIONAL  
RESEARCH AND TRAINING**

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**Proformas**  
**51<sup>st</sup> Rashtriya Bal Vaigyanik Pradarshani (RBVP)**  
**2024) For Children**

Theme: Science and Technology for Society

**Proforma I**

**Information about The Exhibit/Model**

1. Title of the Exhibit/model .....  
 (in BLOCK letters)

2. Sub-theme:

- 1. Health
- 2. LiFE (Lifestyle for Environment)
- 3. Agriculture
- 4. Communication and Transport
- 5. Computational Thinking

3. Name(s) of Contributing Student(s) ..... (M/F); Class .....  
 (in BLOCK letters) ..... (M/F); Class .....  
 ..... (M/F); Class .....  
 ..... (M/F); Class .....

Mobile No. ....

Email .....

4. Name(s) of Guiding Teacher (s) .....(M/F)  
 (in BLOCK letters) .....(M/F)

Mobile No. ....

Email .....

5. Name of the school with complete postal address (in BLOCK letters):  
 .....  
 .....



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

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

Mobile No. ....

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/Backward/Semi-Urban/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

11. Approximate space required for the display of Exhibit .....

12. 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 .....

**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;  
**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;  
**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;  
**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.

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

.....

- .....
- .....
14. 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 51<sup>st</sup> Rastriya Bal Vaigyanik Pradarshani (RBVP) for Children – 2024, it will be considered for publication in the booklet entitled: *Structure and Working of Exhibits*. For convenience, examples of write-ups of exhibits are also given in this booklet.]

*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 lines and labelled diagram of the model, illustrating the working of the exhibit/model.
- (ii) Close-up photographs of the exhibit/model.

15. **Five minutes video presentation in Cd by the student about the exhibit con- training (i) title of the exhibit (ii) sub-theme of the exhibit (iii) working of the exhibit (iv) scientific principle involved in it (v) application etc. should also be sent along with the write-up.**

**note:** (i) Please do not pin or paste the photographs of the exhibits. Enclose them in a separate envelope. A 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)
- (iii) Please of not send the scanned/soft copies of write-ups instead of the video presentation.

**CERTIFICATE OF ORIGINALITY**

We,.....  
hereby declare that the submitted exhibit/model is our original creative work /Modified form of available work and to the best of our knowledge, this exhibit/model has never been developed by any other person in this form.(Strike off, whichever is not applicable.)

(Signatures of all students and teachers)

State/UT \_\_\_\_\_

Duration \_\_\_\_\_

**Rajya Stariya Bal Vaigyanik Pradarshini for Children 2023-24**

**Proforma II**

**Panel of Judges -Sub-Theme wise\***

Venue \_\_\_\_\_

**Theme: Science and Technology for Society**

PERTAINING TO THE SUB-THEME OF

**Sub-themes:** 1. Health 4. Communication and Transport  
(Please tick marks 2. LiFE (Lifestyle for Environment) 5. Computational Thinking  
on the area being 3. Agriculture  
evaluated):

S. 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, mathematics and environment exhibition. NCERT welcomes all such opinions. Kindly enclose them on separate sheets.

## Rajya Stariya Bal Vaigyanik Pradarshani for Children 2023-24

### Proforma III

#### Information About Participating Schools

State/Union Territory : .....

Dates of Exhibition : .....

Venue of Exhibition : .....

Type of School*	Tribal (T)/ Rural (R) /Urban (U)	Number of Schools	Number of Exhibit/Models	Participants from the School													
				Teachers				Students				Students From CWSN Category					
				Male	Female	Other	Total	Boys	Girls	Total	SC/ST	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;

**LB. 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;

**PA. 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;

**PU. 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.

**Rajya Stariya Bal Viagyanik Pradarshani for Children 2023-24**

**Proforma IV**

**Information About Nature and the Number of Exhibits Displayed**

**Theme: Science and Technology for Society**

State/Union Territory : .....

Dates of Exhibition : .....

Venue of Exhibition : .....

Sub-theme	Nature and Number of Exhibits Displayed				Total No Of Exhibits
	Innovative/Improvised/ Apparatus/Working Model	Static Model	Study/Survey Report	Any other (please specify)	
Health					
LiFE (Lifestyle for Environment)					
Agriculture					
Communication and Transport					
Computational Thinking					

**Rajya Stariya Bal Viagyanik Pradarshani for Children 2023-24**

**Proforma V**

**Maintenance of Accounts**

State/Union Territory : .....

Dates of Exhibition : .....

Receipt				Expenditure				Signature of Coordinator
Voucher	Date	Particulars	Amount	Voucher	Date	Particulars (Head)	Amount	
		Draft No.						
		Other in-come, if						
						Balance Refunded to NCERT, if any,		
		<b>Total</b>				<b>Total</b>		

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)

State/UT \_\_\_\_\_

Duration \_\_\_\_\_

## Rajya Stariya Bal Vaigyanik Pradarshini for Children 2023-24

### Proforma VI

**Theme: Science and Technology for Society**

Venue \_\_\_\_\_

### JUDGES' PROFORMA FOR EVALUATION OF PARTICIPATING ENTRIES, SUB-THEMES WISE

**Sub-themes:**  
(Please tick marks  
on the area being  
evaluated):

1. Health
2. LiFE (Lifestyle for Environment)
3. Agriculture

4. Communication and Transport
5. Computational Thinking
6. Others (Please Specify sub theme) .....

S. No	Code of the Exhibit	Involvement of Children's Own Creativity and Imagination 20%	Originality/innovations in the Exhibit/Model 15 %	Scientific Thought / Principal/ Approach 15 %	Technical Skills / Workmanship / Craftsmanship 15 %	Utility for society Scalability 15 %	Economic (low cost)/ Portability/ Durability 10 %	Presentation 10 %	Total 100 %
1									
2									
3									
4									

Date \_\_\_\_\_

Signature \_\_\_\_\_

Name \_\_\_\_\_

Designation and Affiliation \_\_\_\_\_

**Note:** 5 % and 3 % extra weightage may be given to exhibits belonging to rural/backward and semi urban regions respectively.

# 5

## Examples of Write-ups of the Exhibits

Two Examples of Write-ups of the Exhibits Displayed in Earlier Exhibition are Given Below to Facilitate Students to Develop the Write-up of their Exhibit

### A. New Paddy Thresher

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**Student:** Akoijam Kheroda Devi

**School :** Anand Purna Schol, Thoubal District, Manipur

**Teacher :** Robindro Singh

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#### Introduction

In most of the agricultural land area of Manipur, people mainly cultivate paddy. The agriculture sector contributes a major share of the total state domestic product. It provides employment to about half of the total farmers in Manipur. During harvest, farmers spend a lot of money on labour charges to thresh the paddy. In view of this, an eco-friendly machine (model) called 'New Paddy Thresher' is developed. 'New Paddy Thresher' is a manual threshing machine. It can thresh the paddy plants without cutting the straws. Such an eco-friendly machine will help the poor farmers of the country in general and farmers of Manipur in particular to improve their economy.



Figure 1: New Paddy Thresher

#### Material Required

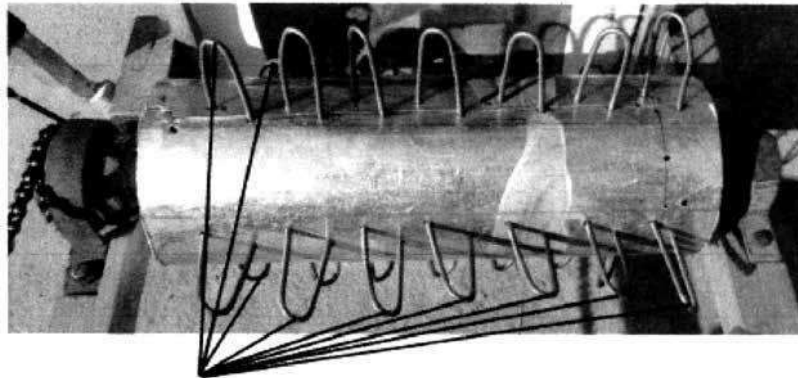
The materials used in this exhibit is U-shaped beating rods; Bearing; Crank shaft; Iron chain; Wood; Bolts and nuts; Paddles; Paddy straw fixers.

#### Scientific Principle Involved

New Paddy Thresher' is based on the principle of the pulley and Lever system.

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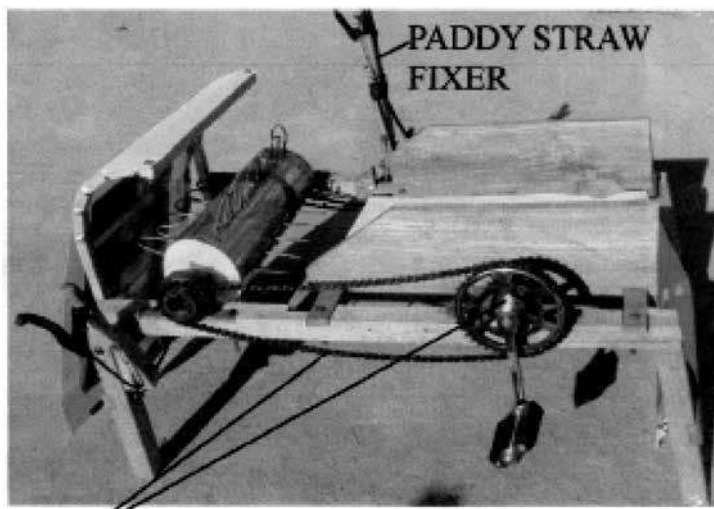




*Figure 2: U-Shape Beating Rods*

### **Construction and Working**

Four rows of U-shaped beating rods are fixed on a cylinder. The two ends of the beating cylinder are fixed by two bearings so as to rotate freely. A pulley is fixed on one end of the beating cylinder and joins the crankshaft with the iron chain. In one complete rotation of the crank, the beating cylinder rotates twice. An armful of paddy straw can be beaten eight times in one complete crank rotation. Three crank rotation is enough for threshing one armful of paddy.



*Figure 3: Crank Shaft with the Iron Chain*

### **Advantages**

- (i) It is low-cost and portable.
- (ii) It is an eco-friendly machine.
- (iii) A farmer can save labor and money by using this thresher.

## A. Vehicular Exhaust Filter

**Student:** Vaibhav Dhama, Saransh Mathur

**School :** Demonstration School, RIE, Ajmer, Rajasthan

**Teacher:** Amarendra Tripathy

### Introduction

We know that many vehicles are increasing air pollution which increases global warming or the temperature of the earth. Many steps have been taken to reduce the emission level of gases coming out from the vehicle exhaust. We can see in heavy traffic areas the level of air pollution is very high. We feel uncomfortable and even feel itching in our eyes in such areas. Increasing air pollution is a danger sign for all living organisms on earth. Exhaust gases coming out from all types of automobiles contains mainly carbon monoxide, carbon dioxide, nitrogen dioxide, hydrocarbons, Sulphur dioxide and other harmful gases. These gases are very harmful for our environment and ecological system. This project is an attempt to solve the problem of high pollution level in cities due to automobiles in heavy traffic areas. This project helps us to reduce the air pollution caused by the vehicles.

### Scientific Principle Involved

In the cooling chamber, two aluminium plates which have a charge on them attract dust particles. The exhaust gases are pushed by the exhaust fan on the nets made of synthetic fibers and a solution of sodium hydroxide (NaOH) is sprayed by the sprayer. NaOH reacts with harmful exhaust gases and neutralizes them. This way, the level of polluted air is very low.

### Materials Required

Bottles of two-liter capacity, T-shaped water pipe joint, two exhaust fans, aluminum foil, NaOH solution, sprayer, battery, etc.

### Construction And Working

In this project, the exhaust gases are collected in the cooling chamber (the shape of the cooling chamber is like a frustum) where due to the expansion of gases their temperature becomes low. In the cooling chamber, there are two aluminium plates which create a charge on them and attract the acidic/basic dust or harmful particles and then an exhaust fan sucks the gases and pushes the gases in the NaOH treatment chamber. We can identify it in Figure 4 where the NaOH reacts with harmful gases and makes them neutral. There is a machine called a sprayer placed after the

exhaust fan which sprays NaOH on the nets of synthetic fibers after every 2 km distance period when the vehicle is running.

In the vertical chamber, the remaining dust particles are separated by an exhaust fan which pushes the gases on a filter so the heavy solid harmful particles settle down.

Then the remaining gases are again treated with NaOH. We can identify it in Figure 5. Finally, cool and fresh air with very low air pollution comes out and spreads out in the environment.

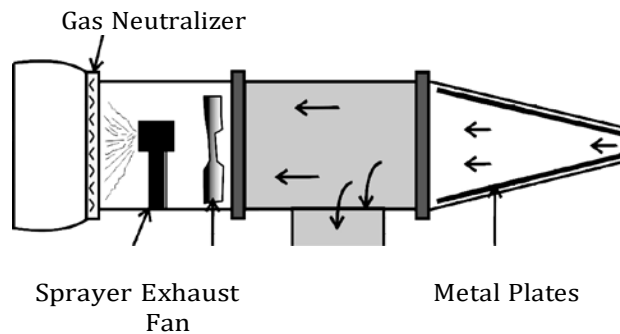


Figure 4

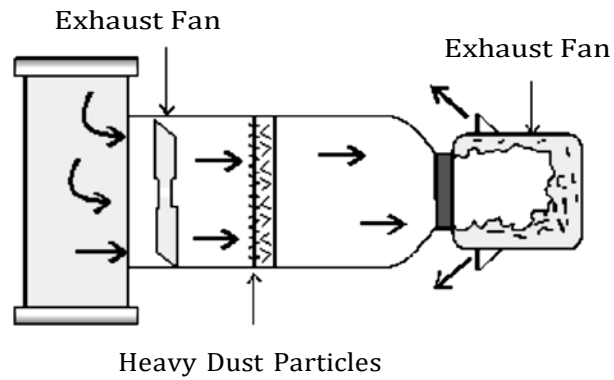


Figure 5

### **Removal of Harmful Particles/Chemicals**

Take out the nets of synthetic fibers and wash them in NaOH solution to remove solid sediments and harmful chemicals periodically.

### **Result**

It ensures lowering of the pollution level in air due to automobiles. So, we can save our earth from pollution.



**Contact Address**  
**Prof. TP Sarma**  
**Coordinator**

**Rajya Stariya Bal Vegyanik Pradarshini 2023-24**

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