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

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, Kendriya Vidyalaya Sangathan, Navodaya Vidyalaya Samiti, Department of Atomic Energy Central Schools, Central Board of Secondary Education affiliated Public Schools (independent), Central Tibetan Schools Administration, Demonstration Multipurpose Schools of Regional Institutes of Education and National Education Society for Tribal Students participate in this national-level exhibition. Like in the past, such exhibitions are to be organised from the district to state level during 2026-27 too. These would form the first phase of preparation for the RBVP (to be organised around November 2027).

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 the 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 together. To solve the problems of the world and to bring peace and prosperity to people and the planet, 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 Viksit Bharat-Guarantee for Rozgar and Ajeevika Mission (Gramin) (VB-G RAM G), *Pradhan Mantri Jan Dhan Yojana* (PMJ-DY), *Pradhan Mantri Jan Arogya Yojana* (Ayushman Bharat), *Skill Development*, the *Swachh Bharat Abhiyaan* (Clean India Campaign), *Pradhan Mantri Ujjwala Yojana*, *Beti Bachao Beti Padhao* (Save the Girl Child, Educate the Girl Child) are some of the steps to achieve this sustainable goal.

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 goal 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 2026-27 has been chosen as **'Science, Technology, and Innovation for a Sustainable and Viksit Bharat'.** The theme and subthemes identified for RSBVP 2026-27 and RBVP 2027 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 2026-27 has been chosen as Science, Technology, and Innovation for a Sustainable and Viksit Bharat'.** One cannot understand 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; Advances in medical imaging and other scientific discoveries have also 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. The theme for RSBVP 2026-27 and RBVP 2027, is **'Science, Technology, and Innovation for a Sustainable and Viksit Bharat'**, and it intends to cover subthemes like-

1. Artificial Intelligence (AI) for Better Life
2. Green Energy & Environmental Conservation
3. Mathematical Modelling and Computational Thinking
4. Health, Hygiene, and Sanitation
5. Indigenous Agricultural Practices
6. Science for Rural Transformation
7. Disaster Management

(*Subthemes listed above are suggestive. Students may choose any other subtheme and develop exhibits involving Science and Technology for Sustainable Future*).

India stands at a transformative juncture in its pursuit of becoming Viksit Bharat as a fully developed and self-reliant nation. Science, Technology, and Innovation (STI) are no longer viewed as isolated academic pursuits, but as the foundational engines for economic growth, national security, and environmental sustainability. Achieving a sustainable and developed India requires moving from "Made in India" to "Designed in India" — prioritizing the "know-why" of scientific discovery over just the "know-how" of manufacturing. Here is how Science, Technology, and Innovation are charting the path toward a Sustainable and Viksit Bharat:

1. **Energy Transition and Green Technologies**

   A core pillar of Viksit Bharat is ensuring that rapid economic growth does not come at the cost of the environment. Sustainability is not an afterthought; it is integrated into the technological blueprint. **Renewable Capacity:** India has already overachieved its Paris 2015 climate commitments nine years ahead of schedule, with about 50% of its installed power

capacity now from non-fossil sources. **Innovations in Storage & Grids:** Sustaining this growth requires deep tech innovations in advanced battery storage, green hydrogen, and smart grids (like the "One Sun, One World, One Grid" initiative) to manage the intermittency of solar and wind power. **Circular Economy**: Schemes like GOBARdhan are leveraging biotech and chemical engineering to turn agricultural waste into biogas and compost, establishing a waste-to-wealth ecosystem.

2. **Deep Tech and Digital Public Infrastructure (DPI)**

India's digital transformation is globally recognized, but the next phase of innovation requires mastering deep technologies that define the 21st century. **Beyond Adoption:** Initiatives like the *IndiaAI Mission, National Quantum Mission*, and *India Semiconductor Mission* are designed to ensure India is not just a consumer of next-generation technology, but a manufacturer and patent holder. **Scaling Digital Public Goods:** India's DPI (like UPI, which handles "billions of transactions every month) is a model for inclusive technology. Expanding this architecture into healthcare, logistics (PM Gati Shakti), and education ensures equitable access to the fruits of economic growth.

3. **Self-Reliance in Space and Defence**

Strategic autonomy is a prerequisite for a developed nation. Science and innovation in these sectors secure national borders while spinning off commercial technologies. **Frugal but Advanced Engineering:** Milestones like the Chandrayaan-3 mission ("the first to land near the lunar south polar region) and the Aditya-L1 solar mission showcase India's ability to execute highly complex space missions cost-effectively. **Commercial Space & Defence:** The integration of private startups into the space sector and the indigenization of defense manufacturing (like the Light Combat Helicopters) reduce reliance on imports and create high-value intellectual property.

4. **Agriculture and Healthcare**

To ensure development is inclusive, STI must solve foundational challenges in food and health. **Climate-Resilient Agriculture:** With climate change threatening yields, scientific intervention through precision agriculture, drought-resistant biotech crops, and AI-driven weather forecasting is critical for food security and rural prosperity. **Accessible Healthcare:** Building on the success of producing 23.5 crore COVID-19 vaccines for global distribution (Vaccine Maitri), India is focusing on affordable biotech, AI-driven diagnostics, and genomic research to manage public health at a massive scale.

5. **The Ecosystem Enablers**

To cross the "valley of death"—the gap between a laboratory discovery and a viable market product the government has implemented structural enablers:

- **Anusandhan National Research Foundation (ANRF):** Aims to seed, grow, and promote R&D across India's universities, shifting the focus from isolated labs to dynamic ecosystems.
- **Science and Technology Clusters:** These clusters serve as collaborative hubs bringing together academia, industry, and the government. They reduce duplication of effort and accelerate the commercialization of tech in areas like clean energy and water management.
- **Research, Development, and Innovation (RDI) Fund:** A massive corpus designed to provide long-term, patient capital to innovators in sectors with long gestation periods, like advanced materials and aerospace.

To reach Viksit Bharat by 2047, India must successfully weave scientific research, robust technological infrastructure, and sustainable practices into the very fabric of its national strategy.

National initiatives like Digital India and Bharat Net are laying the foundation for a digitally empowered society. These programmes rely greatly on skilled professionals to build and maintain robust digital infrastructure. Cyber security, data analytics, and cloud computing are essential tools in protecting national interests and enabling e-governance. The digital revolution is also democratizing access to services from education and banking to healthcare and agriculture and ensuring that no citizen is left behind. The National Education Policy 2020 marks a paradigm shift in

India's approach to learning. It emphasizes experiential learning, coding, and interdisciplinary thinking, preparing learners for the demands of a tech-driven future. Initiatives like Atal Tinkering Labs and PM SHRI Schools are nurturing creativity and problem-solving skills among our young minds. Programmes such as VIGYAN JYOTI is promoting gender equity in STEM, encouraging more girls and women to pursue careers in Science and Technology. Meanwhile, Skill India is bridging the gap between academia and industry, equipping youth with practical, job-ready skills through vocational training and apprenticeships. Our country's Science and technology driven progress is not limited to domestic achievements. The country is more and more recognised as a global leader in innovation, sustainability, and technology. From climate action, digital diplomacy, space collaboration and AI, country is shaping global conversations and offering scalable solutions to shared challenges. By investing in STEM education, research, and entrepreneurship, our country can completely harness its demographic dividend and realise the vision of a Viksit and Atmanirbhar Bharat. This journey is not just about economic growth; certainly, it's about building a resilient, inclusive, and future-ready nation.

For nationwide promotion of sustainable development, the United Nations (UN) has launched the 2030 Agenda for **Sustainable Development Goals (SDGs).** This is a global level agenda that aims to promote actions and policies that will end poverty and develop a sustainable future. There are 17 goals and 169 specific targets to be achieved by 2030 which aims for ending poverty and hunger, promotion of good health, quality education, affordable and clean water and energy resources leading to increment in the global economy along with industrial innovation and infrastructure. For achieving the sustainable goals, the actions and its regulation should be done at each level such as - civil society, government commercial business, which requires equal contribution from the people.

Sustainable development is not only limited to environmental and climatic aspects, but it also demands the sustainability for rapid increase in food demands that is agricultural sustainability, awareness and maintenance of health by consuming super food like millets, natural farming, good sanitation practices and hygiene in an individual, advancements and innovation in transport and communication systems which are environment friendly, good waste management practices to prevent contamination of soil, planned management of resources which are available in the environment like water, sunlight, wind and fossil fuels. It also includes prior prediction of natural disasters and its management as it requires mathematical modelling and computational thinking which can help in understanding of the complex economic, social, and environmental phenomena underlying sustainable development.

According to **"Sustainable Development Goals-National Indicator Framework Progress Report 2024"** documented by the Ministry of Statistics and Program Implementation, the government has launched various welfare and reformation programs over the past ten years such as National Nutrition Mission (NNM), Pradhan Mantri Jan Dhan Yojana, Make in India, National Mission for a Green India, Pradhan Mantri Swasthya Suraksha Yojana, National Mission for Sustainable agriculture "and driving significant advancements. The motto '**Leaving No One Behind,** remains persistent, aligning with our national ethos of **'Sabka Saath, Sabka Vikas, Sabka Vishwas, Sabka Prayas'.**

The Department of Science and Technology objectives to promote science and technology development in various fields which include materials, devices and processes. It launches and funds the programme which supports activities aimed at developing technologies both in the advanced/emerging sectors/areas, and innovation of a useful technology/product. It promotes advanced waste, biomedical device and technology development programs.

In order to prevent environmental crises and to make the process of sustainable development more feasible and operational, it is important to:

- Integrate science and technology at global level and develop awareness by education in science, geography, economics and at society level.
- Developed countries need a reformation of their production and consumption patterns,

including by limiting the use of fossil fuels and plastics, and to encourage public and private investments that align with the SDG's.

- Environmental resources such as rain forest, oceans, lands must be safeguarded as crucial sources of ecosystem services and natural resources. Citizens must work in a planned and coordinated manner for conservation, restoration and sustainable utilization of natural resources.
- Decreasing the extraction of resources so that it can be replenished timely.
- The waste generated should remain within the absorption capacity of the environment.

The sustainable development can be attained by smaller actions in our day-to-day life such as:

- Restricting anthropologic activities such as by minimizing all kinds of pollution-air, water, land etc.
- Sustenance in agricultural practices such as use of bio-manure, bio- pesticides, bio-insecticides which are devoid of harmful chemicals.
- Crop rotation system and by using techniques such as drip irrigation systems that can efficiently minimize the water usage in agriculture.
- For renewable resources of energy, the rate of consumption should not be more than the rate of generation of renewable substitutes. Solar panels and the windmills can be efficiently used to generate electrical energy. These alternatives can prevent the exploitation of fossil fuels and are also helpful for saving the environment from pollution.
- Improvement in human capacity through better education and healthcare systems.
- Providing safe, clean drinking water and nutritious meal responsible use of information technology to plan smart infrastructure.

Therefore, the expenditure of resources should be done in a planned manner without compromising the needs for future generation and to sustain all the resources given by nature.

The integration of science and technology requires a more innovative and ambitious response in order to bring a change at an enormous level to achieve our 2030 goals and a sustainable future. To achieve this objective, NCERT organizes the National Science Exhibition every year i.e., Rajya Stariya Bal Vaigyanik Pradarshani (RSBVP 2026-27) to reflect the essence of the National Education Policy 2020 and is being organized every year in collaboration with the state/UT on a rotation basis. The theme of RSBVP 2026-27 is 'Science, Technology, and Innovation for a Sustainable and Viksit Bharat' in order to promote sustainable development through innovations in science among school students. RSBVP aims to create awareness and innovation in science for sustainable development among younger minds. It provides an opportunity to the school students/learners/researchers to pursue their natural creativity and innovation, reflecting their scientific temperament. This theme will develop an understanding amongst the school children towards the need for integration of science and technology for a sustainable future.

The students exhibit their innovative ideas in the form of presentations and working models which help the students to apply scientific knowledge to achieve a sustainable future by providing scientific solutions. It encourages the children to visualize the sustainable future of the nation and helps them become sensitive and responsible citizens along with the development of science and technology as a major instrument for achieving goals of self-reliance and socio-ecological development.

By such programs, students interact with participating children, teachers, parents, and exhibition organizers and they together give their valuable contribution to develop a sustainable future for the nation.

A few exemplar ideas pertaining to the subthemes listed in the context of the theme development of exhibits are given below.

1. Artificial Intelligence (AI) for Better Life

Artificial Intelligence (AI) is a technology that enables computers or machines to perform tasks

that usually require some form of human intelligence. These tasks may include writing on given topics, generating images, recognising patterns, learning from examples, understanding language, making predictions, solving problems and suggesting decisions. An AI system learns from suitable data and examples; its performance depends on the quality and relevance of the information it receives.

We already encounter AI in everyday life—for example; voice assistants, chatbots, language translation, image recognition and recommendation systems. But from a science exhibition perspective, the important question is: "Is there a real problem around us that AI can help solve?" Instead of making a model that only explains how AI can identify waste, a student could develop a simple system that recognises selected types of waste from images and helps sort them. Instead of only explaining smart irrigation, a student could combine soil-moisture data and weather information to suggest when a plant needs watering. For India, students can explore AI solutions that are low-cost, locally relevant, accessible and useful to different communities, including solutions involving Indian languages, rural areas, agriculture, education and accessibility.

The exhibits or models in this subtheme may pertain to these areas:

A. Education and Learning

- Identify topics in which a student needs more practice and recommend contents from DIKSHA, YouTube or other such learning avenues.
- Develop a quiz system that adapts to the student's level and accordingly generates the next question and provides suitable solutions.
- Analyse common mistakes in a set of student responses and suggest topics for revision.
- Develop a simple learning assistant in an Indian language.
- Create a tool that reads digital text in an Indian language aloud.

B. Health, Fitness and Daily Well-being

- Use sensor data to distinguish activities such as walking, sitting and running.
- Develop a reminder system for water intake, physical activity or sleep routines.
- Classify commonly available foods and display basic nutritional information.
- Detect an unusual movement or event using sensors and send an alert to a designated person or system.
- Develop an accessibility tool using speech or image recognition.

(Note: *AI projects in this area should provide support or reminders, not medical diagnosis or treatment.*)

C. Agriculture and Food

- Train an image-based model to identify whether a plant is healthy or showing signs of disease.
- Combine soil-moisture and weather information to suggest when watering may be needed.
- Recommend suitable crops using selected soil or environmental parameters.
- Analyse weather information and generate simple alerts useful for farming.
- Identify selected crop pests from images, and recommend pest control measures.

D. Environment, Waste, Water and Energy

- Recognise wet, dry or recyclable waste from images.
- Build a smart dustbin combining image recognition with sensors for waste segregation.
- Use local environmental data to study or predict changes in air quality.
- Use rainfall, soil and water-use data to identify opportunities to reduce water wastage.
- Analyse electricity-use patterns and suggest ways to reduce unnecessary consumption.

E. Safety, Disaster Management and Transport

- Use rainfall and water-level data to develop a model for an early flood warning.
- Identify selected unsafe road situations and provide a warning.
- Develop a model that suggests a safer or faster emergency route.
- Analyse traffic flow at a selected location and suggest ways to improve movement.

F. Accessibility, Languages and Community Services

- Convert spoken words in Indian languages into text.
- Read digital text aloud for a person who has difficulty reading.
- Describe selected objects or scenes in an image.
- Recognise a limited set of gestures or communication patterns.
- Translate simple sentences between selected Indian languages.
- Develop a voice-based assistant that provides useful local information.
- Build a multilingual help desk for frequently asked questions about a school or community service.

2. Green Energy & Environmental Conservation

Over the years, the population in cities has been growing steadily. More than half (about 57%) of the world's population now lives in cities. This number is even higher in developed countries. More and more people are moving to urban areas, and the number of people living in cities is expected to keep growing. Cities are made up of buildings, construction projects, and many kinds of infrastructure, all of which need energy to build and to run every day. Buildings and construction account for a substantial share of global energy use and emissions, most of it going towards lighting, heating, cooling, and air conditioning. For years, this energy has come from burning fossil fuels like coal, oil, and gas. These sources are not endless and will eventually run out, making things harder for future generations.

Another problem is that burning fossil fuels causes warming. When coal, oil, and gas are burned, they release gases such as carbon dioxide into the air, leading to climate change, which disrupts how heat moves through the air and oceans, how water moves through the environment, and how snow and ice form. Global average warming of even 1.5°C is serious; higher warming increases sea-level rise, extreme weather and disease spread. Even though cutting down on carbon dioxide emissions seems like the solution, doing so can have major effects on the economy, jobs, investments, trade, and the way people live. For example, if a factory that uses coal is shut down to stop carbon dioxide emissions, it might reduce pollution and health problems, but it could also cost jobs, disrupt trade agreements, cause economic strain, and affect people's overall well-being.

That is why it is important to find energy sources that are safe and not too costly so that the economy can keep growing. This issue can be solved by using renewable energy.

Green energy is energy that comes from sources that don't harm the environment much and can be inexhaustible. This includes solar, wind, hydro, biomass and geothermal energy. These types of energy help reduce the effects of fossil fuels, lower the amount of greenhouse gases produced when making power, and let people take care of the environment while getting the clean energy they need.

Developments around the world show that increasing green energy efficiency requires continued advances in technology. These technologies can make a significant contribution to the sustainable development of the energy sector and the economy as a whole, through the production of clean and inexhaustible energy. Several such green energy technologies are currently under discussion.

The first is solar energy technology, which mainly takes two forms: solar cells and concentrated solar power stations. Both work towards increasing energy conversion efficiency and reducing production costs. The second is wind energy technology developing in two directions: onshore and offshore wind power generation. Together, these aim to reduce costs, increase power, efficiency, reliability, and safety, and reduce environmental impact. The third is bioenergy technology covering biogas, biodiesel, and bioethanol production, which works towards increasing the efficiency of converting biomass feedstocks and organic residues into useful fuels (biogas, biodiesel, bioethanol) and improving quality in terms of both stability and environmental neutrality. The fourth is electricity storage technology, directed towards batteries and storage power plants, aiming to increase specific capacity, power, and

working life while reducing costs. The fifth is fuel cell technology, which creates energy through an electrochemical reaction rather than the burning of fuel; this includes proton-exchange membrane fuel cells, solid-oxide fuel cells, and molten carbonate fuel cells, which together work towards increasing energy conversion efficiency, reducing costs, and increasing reliability. The sixth is smart-grid technology, an advanced electrical network that uses digital technology, sensors, and two-way communication to monitor and manage the flow of electricity in real time. Unlike conventional grids, which have limited real-time sensing and control, smart grids add two-way communication, automation and real-time control. This helps integrate energy sources like solar and wind power, automatically adjusting to changes in supply and demand. Smart grids increase the reliability and safety of electricity supply, increase the automation of processes, apply digital technologies and microprocessor-based devices in monitoring and management systems, and reduce running costs. Another important form of energy is Green Hydrogen, hydrogen produced using renewable energy, such as solar or wind power, instead of fossil fuels. In this process, water is split into hydrogen and oxygen through electrolysis using electricity generated from panels or wind turbines. According to standards notified by the Government of India, hydrogen produced this way is considered "green" only if the total emissions is less than 2 kg CO_2 eq per kg H_2, as notified by MNRE. Green hydrogen can also be produced by converting biomass, such as waste, into hydrogen as long as emissions remain below this same limit.

India wants to add 500 GW of non-fossil fuel electricity capacity by 2030, be energy independent by 2047, and have net-zero emissions by 2070. India has government schemes that are helping to bring about this change. "*Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan* (PM-KUSUM)" was started to give farmers solar-powered irrigation pumps and small solar plants on their farms. This way, farmers can earn money by using solar power for their fields and can have reliable energy with off-grid solar pumps instead of diesel pumps. PM-KUSUM aims for 34,800 MW of power. The National Green Hydrogen Mission, started in January 2023, has the objective of India becoming a world center for making, using, and selling hydrogen and its products. It aims to produce 5 million tons of green hydrogen every year by 2030. The National Green Hydrogen Mission will need about 125 GW of renewable power, will bring in more than ₹8 lakh crore of investment, will create more than 600,000 jobs, and will prevent the emission of almost 50 million tons of greenhouse gas each year. Green hydrogen is being seen as a fuel for hard-to-clean sectors, like steel, fertilizer and big transport.

Despite its advantages, the large-scale adoption of green energy faces several practical challenges. Solar and wind energy generation depends on weather and time of day, requiring storage solutions such as batteries or pumped hydro to ensure a continuous power supply. Setting up panels, wind turbines, or hydrogen electrolysers involves significant upfront investment even though operating costs are low over time. Rural and remote areas often lack the grid infrastructure needed to transmit and distribute energy efficiently. Large solar or wind farms require land area, which can compete with agricultural or ecological land use. Lack of public awareness can also slow the adoption of new green technologies at the household and community level.

The PM *Ek Ped Maa Ke Naam* (One Tree in Mother's Name) is an initiative that encourages every citizen to plant a tree in the name of their mother as a symbol of love, care, and gratitude. Trees are essential for maintaining a healthy environment because they provide oxygen, absorb carbon dioxide, reduce pollution, conserve soil, and support biodiversity. By planting and caring for a tree, we can honor our mothers while also contributing to a greener and healthier planet. This simple act reminds us that, just as a mother nurture and protects her family, a tree nurtures and protects nature. Every tree planted today can become a valuable gift for future generations.

The main objectives of this subtheme are to create awareness among students about the limited nature of fossil fuels and the environmental cost of their continued use; to explore scientific and technological innovations in harnessing solar, wind, biomass,

hydro, and geothermal energy; to encourage low-cost, accessible designs that can bring green energy to underserved and rural communities; and to help children think critically about the trade-offs involved in transitioning from fossil-fuel-based to renewable energy systems.

The exhibits or models in this subtheme may pertain to:

- Working models of solar-powered devices.
- Models that show how to generate electricity from wind, biomass, or small-scale water systems.
- Low-cost tools that use geothermal energy for heating or power.
- Creative ideas for combining different types of renewable energy, such as solar and wind, to provide power in rural or remote areas.
- Models that show how to turn farm or organic waste into biogas or other forms of energy.
- Devices or models that demonstrate energy storage, such as batteries and capacitors, can address times when renewable energy is not available.
- Smart or internet-based systems to monitor and avoid wastage of energy used in a home or community.
- Models that compare the carbon footprint of energy from fossil fuels against energy from green sources.
- New low-cost ways to make green energy technologies more accessible to people with fewer resources.
- Models that show how to design buildings that use less energy, such as through passive solar heating or cooling, green roofs, and insulation.
- Ideas or models that show how green energy solutions could be integrated into government programmes, such as rural electrification, Saubhagya Yojana, and PM-KUSUM.

Models exploring the use of green hydrogen as a clean fuel alternative.

3. Mathematical Modelling and Computational Thinking

Mathematical modelling and computational thinking are important tools for understanding real-life situations and developing practical solutions to complex problems. They connect classroom mathematics with everyday life, science, technology, the environment, and society. These approaches are especially significant in the context of sustainable development because they help learners study problems related to water conservation, waste management, agriculture, transport, energy use, disaster management, and climate change. The guidelines for the RSBVP emphasise that students should use science and mathematics to investigate problems, develop innovative ideas, and design models that contribute to a sustainable future.

Mathematical modeling is the process of representing a real-world situation through mathematical concepts, equations, graphs, functions, measurements, or algorithms. A mathematical model is a simplified representation of a real problem. Since real-life situations are often complex, a model focuses on the important features and relationships while making suitable assumptions and approximations. Mathematical modeling generally involves identifying a problem, collecting relevant information, simplifying the situation, formulating a mathematical representation, solving or analysing the model, validating the results, and interpreting the solution in the original context.

For example, the height of a tower may be difficult to measure directly with a measuring tape. However, if the distance from the tower and the angle of elevation are known, trigonometric relationships can be used to estimate its height. Similarly, the growth of an investment can be represented through the compound-interest formula, while the total cost of producing goods can be modeled using a linear equation. Such examples show that mathematics is not limited to numerical calculations; it can also be used to make predictions, compare alternatives, and support decision-making.

Computational thinking is a systematic method of solving problems by using ideas associated with computer science. It is not limited to writing computer programs or using digital devices. It can be applied by students in daily life,

mathematics, science, and social situations. The major components of computational thinking are decomposition, pattern recognition, abstraction, algorithm design, and evaluation. Decomposition involves breaking a large and complex problem into smaller, manageable parts. Pattern recognition means identifying similarities, relationships, or regularities in data and situations. Abstraction focuses attention on the essential features of a problem while ignoring unnecessary details. Algorithm design involves preparing a clear, step-by-step procedure for solving the problem. Finally, evaluation involves checking whether the solution is correct, efficient, practical, and suitable for the given situation.

Mathematical modeling and computational thinking complement one another. Modeling helps learners translate a real-world problem into mathematical form, while computational thinking helps them organize information, develop procedures, test solutions, and improve their models. For instance, students may design a model for conserving water in their school. They can collect data about daily water usage, divide the problem into areas such as drinking water, sanitation, gardening, and cleaning, identify patterns of wastage, formulate mathematical estimates, and design an algorithm for reducing consumption. They may then use a spreadsheet, graph, physical model, or simple coding activity to compare different strategies.

These approaches promote logical reasoning, creativity, collaboration, critical thinking, and problem-solving. They also encourage students to learn through observation, experimentation, data collection, and model construction. Exhibits based on mathematical modeling and computational thinking should therefore not merely display ready-made information. They should demonstrate how students identify a real problem, develop assumptions, represent it mathematically, test possible solutions, and explain the usefulness and limitations of their model. In this way, mathematical modeling and computational thinking enable learners to understand the world more deeply and participate meaningfully in creating an innovative, responsible, and sustainable future.

4. Health, Hygiene, and Sanitation

'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. Health is the foundation that supports every aspect of your life. It allows you to pursue your goals and enjoy every experience life brings. A healthy population contributes to increased productivity, an improved quality of life and the overall socio-economic development. Health is influenced by several factors, including nutrition, personal hygiene, sanitation, safe drinking water, lifestyle, environmental conditions, access to healthcare and the prevention and management of diseases.

School-going children undergo important physical, emotional and social changes, particularly during adolescence. As children move towards greater independence, they also need to develop healthy personal-care habits and take greater responsibility for their own health and hygiene. At the same time, children cannot maintain good hygiene through individual efforts alone. Schools have an important role in providing clean, safe, child-friendly and inclusive water, sanitation and hygiene (WASH) facilities. Clean and functional toilets, safe drinking water, handwashing facilities, menstrual hygiene support and proper waste management are essential for maintaining children's health, dignity, safety and regular participation in school.

Diseases affecting human health may be communicable or non-communicable in nature. Communicable diseases such as tuberculosis, dengue, malaria, chikungunya and other infectious diseases can spread through contaminated water and food, poor hygiene, unsafe sanitation, vectors and other means of transmission. Non-communicable and lifestyle-related health problems such as obesity, diabetes, hypertension and cardiovascular diseases are also increasing concerns. Unhealthy dietary practices, inadequate physical activity, stress, insufficient sleep and excessive use of digital devices may further affect physical and mental well-being. Personal hygiene and cleanliness play an

important role in maintaining good health and preventing the spread of diseases. Simple practices such as regular handwashing; safe food handling; proper waste disposal; maintaining clean surroundings and preventing waterlogging; maintaining clean nails and clothes can make a significant difference to health. Safe drinking water, sanitation and hygiene are also essential for reducing waterborne and vector-borne diseases and for improving the quality of life of communities.

Improper disposal of household, sanitary and medical waste, pollution, and unsustainable use of resources can adversely affect human health and the environment. Scientific and technological interventions can help in addressing these challenges through improved sanitation systems, water purification and conservation, waste segregation and treatment, pollution control, disease surveillance and affordable healthcare technologies. Science, technology and innovation have made significant contributions to improving human health through advances in disease diagnosis, prevention and treatment, vaccines, medicines, biomedical technologies, medical devices and digital health services. Continued innovation is required to develop affordable, accessible, sustainable and locally appropriate solutions to emerging health challenges.

The Government of India has launched several programmes and initiatives related to health, hygiene and sanitation. These include initiatives such as the Swachh Bharat Mission (SBM), National Action for Mechanised Sanitation Ecosystem (NAMASTE). Such programmes highlight the importance of collective action, scientific approaches, appropriate technologies and community participation in improving public health and environmental sustainability. The Sustainable Development Goals (SDGs) also recognize the importance of these issues. SDG 3 focuses on good health and well-being, while SDG 6 focuses on clean water and sanitation. These goals emphasise the importance of healthy lives, well-being, safe water, sanitation and sustainable practices. The objectives of this subtheme are, therefore, closely linked with the vision of a healthy, sustainable and Viksit Bharat.

The main objectives of this subtheme are to bring awareness among children about the factors affecting health, hygiene, and sanitation; to explore scientific, technological and biomedical innovations in the prevention, diagnosis and treatment of diseases; and to encourage children to develop innovative and sustainable solutions to health and sanitation-related problems. The subtheme also aims to encourage children to identify health, hygiene and sanitation-related problems in their schools and communities and develop practical, affordable, inclusive and sustainable solutions.

The exhibits/models in this subtheme may pertain to:

- Factors affecting human health and the prevention of common diseases through scientific / technological interventions.
- Innovative projects and models demonstrating the role of personal hygiene, handwashing and cleanliness in preventing the spread of diseases.
- Innovative ideas related to health awareness, disease prevention, blood and organ donation, mental well-being, healthy lifestyles, and community health.
- Improved, water-efficient and sustainable methods of sanitation, including innovative solutions for schools, rural and urban communities.
- Innovative methods for toilet hygiene, prevention of open defecation, maintenance of sanitation facilities and reporting of sanitation-related problems.
- Innovative technologies for segregation, collection, treatment, recycling and safe disposal of biodegradable, non-biodegradable, sanitary and biomedical waste.
- Innovative approaches for effective implementation of Government of India programmes and initiatives related to health, nutrition, hygiene, sanitation and safe drinking water, including SBM, NAMASTE and TSC.
- Scientific and technological solutions for safe drinking water, including purification, testing, storage, distribution, conservation and wastewater treatment and reuse.
- Innovative approaches for preventing waterlogging and mosquito breeding and

controlling vector-borne diseases and other infectious diseases.

- Demonstration of scientific and evidence-based traditional practices that contribute to health, hygiene and sanitation.
- Demonstration of the health benefits of physical exercise, yoga and other scientifically supported physical activities.
- Models demonstrating the importance of a balanced and nutritious diet and the nutritional value of different food items.
- Innovative solutions for promoting healthy eating habits and reducing excessive consumption of junk and ultra-processed foods and for food safety, storage and handling.
- Low-cost and safe techniques for detection and prevention of food adulteration and contamination.
- Innovative technologies for safe food storage, preservation and handling to prevent contamination and food-borne diseases.
- Innovative technologies for water conservation, wastewater treatment, recycling and reuse in sanitation and hygiene systems.
- Eco-friendly methods for pollution control, pesticide alternatives and sustainable practices that protect human health and the environment.
- Innovative ideas demonstrating the relationship between climate change, environmental changes and emerging health challenges, including heat stress and infectious diseases.
- Innovative and inclusive solutions for children, elderly persons and persons with disabilities, including assistive and accessibility-related technologies.
- Innovative ideas promoting menstrual hygiene, appropriate facilities and safe and sustainable disposal of menstrual products.
- Low-cost medical diagnostic, therapeutic and assistive devices for improving access to healthcare, particularly for underserved communities.
- Digital health technologies, wearable devices, sensors, artificial intelligence and data-based approaches for health, hygiene, sanitation and environmental monitoring.
- Models demonstrating the effects of stress, inadequate sleep, sedentary lifestyles, excessive digital-device use and substance abuse on health, along with preventive measures.
- Innovative ideas to promote mental health, emotional well-being and healthy coping mechanisms.
- Innovative ideas for prevention of substance abuse and harmful use of tobacco, alcohol and other addictive substances.
- Innovative ideas for improving accessibility, affordability and quality of healthcare services for all sections of society.
- Any other innovative, science- and technology-based idea that addresses a real-life problem related to health, hygiene and sanitation and contributes towards a healthy, sustainable and Viksit Bharat.

5. Indigenous Agricultural Practices

India has a rich and diverse heritage of indigenous agricultural practices developed by farming communities over generations through close observation of local soils, climate, water availability, biodiversity and seasonal cycles. These practices are not uniform across the country; they vary with agro-climatic conditions, landscapes, crops, and local knowledge systems. Indigenous agricultural practices refer broadly to locally evolved, community-based and intergenerational agricultural knowledge and practices developed in response to specific ecological, resource, cultural, and climatic conditions.

This subtheme invites students to explore, document, and scientifically investigate agricultural practices evolved by local and indigenous communities in response to their ecological, resource, and climatic conditions. Projects may address traditional approaches to soil and water conservation, seed preservation, crop diversity, mixed cropping, crop rotation, agroforestry, natural resource recycling, pest management, livestock integration and climate resilience. Students are encouraged to combine indigenous knowledge with scientific inquiry, experimentation and contemporary technologies to develop evidence-based, sustainable and locally appropriate agricultural solutions.

Major Indigenous Agricultural Practices in India

- **Traditional water harvesting and management:** Indian farmers have developed numerous region-specific systems for collecting, storing and distributing rainwater. The following are some of the examples: *Johads:* community-based rainwater-harvesting/storage structures, often earthen, used for rainwater harvesting, particularly in Rajasthan and adjoining regions. *Khadins:* runoff-based farming systems adapted to arid regions of Rajasthan. *Ahar–Pyne systems:* The ahar-pyne system consists broadly of ahar storage structures and pynes (channels) used to convey and distribute water, historically associated particularly with South Bihar. *Eri/tank irrigation systems:* traditional tank (eri) systems, including interconnected tank cascades in some regions, used for water storage, irrigation and groundwater recharge. *Kuls:* traditional channels used for conveying water in Himalayan regions. *Baolis/stepwells:* traditional structures for water storage and access. The significance of traditional water harvesting and management includes several benefits, such as harvesting rainwater and reducing runoff, supporting irrigation during dry periods, promoting groundwater recharge in suitable settings, reducing dependence on external water sources, and demonstrating adaptation to local geography and rainfall patterns.
- **Indigenous soil and water conservation:** Traditional farmers have used practices such as terracing, contour cultivation, field bunding, vegetative barriers, mulching, maintaining ground cover, and incorporating organic residues. These practices can reduce soil erosion and help retain water and soil nutrients.
- **Mixed cropping and intercropping:** Growing two or more crops together is an important traditional practice. Examples include combinations of cereals and pulses, millets and pulses, maize and legumes. Different crops may use light, water, nutrients and physical space differently. Legumes can also form symbiotic associations with nitrogen-fixing bacteria. Potential benefits include greater crop diversity, more efficient resource use, risk diversification, improved resilience to environmental fluctuations, and producing multiple food products from the same field. Importantly, benefits depend on crop combinations, planting density, soil, climate, and management, so students should investigate rather than assume intercropping is always superior.
- **Crop rotation:** Traditional agricultural systems have used sequences of different crops rather than repeatedly cultivating the same crop. Examples include cereal–pulse rotations such as rice–pulse, maize–pulse or millet–pulse systems, depending on local agro-climatic conditions. Crop rotation diversifies nutrient demand, interrupts pest and disease cycles, supports soil fertility, improves biological activity, and reduces dependence on a single crop. Legumes are particularly important because of their association with biological nitrogen fixation.
- **Indigenous seed selection and conservation:** Farmers have traditionally selected and maintained seeds based on characteristics such as local adaptation, yield, maturity period, resistance/tolerance to environmental stresses, food quality, storage characteristics, and cultural & culinary importance. Community-level seed exchange and household seed storage have helped maintain crop diversity. Indigenous seed conservation can support agricultural biodiversity, the availability of locally adapted genetic resources, diversification of crops and varieties, resilience to environmental variability, and the preservation of traditional food systems and knowledge.
- **Traditional organic resource recycling:** Traditional farms have often recycled locally available biological materials through farmyard manure, compost, crop residues, green manuring, animal wastes, and biomass

recycling. These practices recycle nutrients within the farm system. They add organic matter to soil, reduce agricultural waste, can improve soil structure and water-holding characteristics, and support a more circular agricultural system. However, students should distinguish between organic farming as a defined production system and individual traditional practices such as composting or manure application.

- **Traditional pest-management practices:** Traditional farmers have used several approaches to minimise crop damage, including botanical preparations, neem-based materials, ash and other locally available materials, physical removal of pests, crop diversification, altering sowing times, maintaining beneficial organisms, and traditional storage practices. These approaches illustrate the principle of managing agricultural ecosystems rather than relying exclusively on a single pest-control method. Some of these practices align with principles incorporated into modern Integrated Pest Management (IPM), which combines cultural, biological, mechanical, and, where necessary, chemical approaches.
- **Agroforestry and integrated farming:** In many regions, farmers have traditionally combined trees, crops, livestock, and other useful plants. This creates a more interconnected farm ecosystem. Trees can contribute to soil conservation, habitat for organisms, biomass production, microclimate modification, carbon storage, and diversification of farm products. Livestock can contribute to nutrient cycling through manure, while crop residues can provide livestock feed or other useful biomass. This can be represented as a circular farm model rather than a linear production system.

- **Traditional climate-adaptive agriculture:** One of the most significant features of indigenous agriculture is its local adaptation. Farmers have historically selected crops, varieties, sowing times, and cultivation practices based on rainfall patterns, temperature, soil type, topography, water availability, and growing-season length. For example, cultivating millets and other drought-tolerant crops is particularly relevant in water-limited agricultural environments. Such practices can diversify food systems, adapt to climatic variability, reduce dependence on water-intensive crops where appropriate, and maintain local agricultural biodiversity. However, climate resilience should be demonstrated with evidence for the specific practice and location, rather than generalised to all indigenous practices.
- **Indigenous knowledge of local agro-ecosystems:** Traditional farmers often possess detailed knowledge of local soil characteristics, seasonal weather patterns, crop behaviour, plant and animal diversity, water availability, agricultural pests, and seed characteristics. This represents a form of location-based ecological knowledge. Its significance lies in its ability to provide valuable starting points for scientific investigation and locally appropriate innovation.

Why are Indigenous Agricultural Practices Significant?

- **Conservation of biodiversity:** Traditional agricultural systems can maintain diverse crop varieties, livestock, trees, and associated organisms. Agricultural biodiversity provides options for responding to changing environmental and societal conditions.
- **Efficient use of local resources:** Many traditional practices rely on locally available resources, such as rainwater, biomass, livestock, local seeds, and human knowledge. In suitable systems, this can reduce dependence on external inputs.
- **Soil health:** Practices such as residue retention, composting, manuring, crop diversification, and appropriate rotations can build soil organic matter and support nutrient cycling.

- **Water conservation:** Traditional water-harvesting and soil-management systems show how agriculture can adapt to local water availability.
- **Climate resilience:** Crop diversity, locally adapted varieties, water conservation and diversified farming systems can provide mechanisms for managing climatic variability.
- **Sustainable resource use:** Many indigenous practices emphasise recycling, reuse and maintaining ecological relationships, principles that are highly relevant to sustainable agriculture.
- **Food and nutritional diversity:** Traditional crops, including diverse millets, pulses, oilseeds, vegetables, and other locally adapted crops, can support diversified diets and food systems.
- **Preservation of cultural heritage:** Agricultural knowledge is often closely associated with local food traditions, festivals, community practices, traditional occupations, landscapes, and local terminology. Preserving this knowledge therefore contributes to cultural and agricultural heritage.
- **Empowerment of local communities:** Recognising farmers and local knowledge holders as knowledge contributors and innovators can strengthen participatory approaches to agricultural development.
- **Source of scientific innovation:** Traditional practices can serve as hypotheses for modern scientific research. For example, traditional observation can lead to a scientific question, which then guides a controlled experiment and generates evidence that informs practice. This approach is especially beneficial in school science education, as it links local knowledge with scientific investigation.

The exhibits/models under this subtheme may pertain to:

Each project may be presented through six components:

- *The indigenous practice:* What is it? Where is it practised?
- *The problem it addresses:* Examples: Water scarcity? Soil erosion? Pest management? Nutrient depletion?
- *Scientific principle:* Why might it work?
- *Working model:* A functional miniature system.
- *Experimental evidence:* Tables, graphs, photographs and observations.
- *Future application:* How can the practice be improved, scaled, combined with modern technology, or adapted to present-day conditions?

6. Science for Rural Transformation

Science has emerged as a transformative force in rural development, enabling communities to overcome poverty, inequality, and environmental challenges while fostering resilience and inclusivity. By blending modern technology with traditional knowledge, it advances agriculture through climate-smart practices such as crop diversification, natural farming, and biochar application, while precision tools like sensors, drones, and artificial intelligence optimize resource use and strengthen food security. Digital platforms like the National Agriculture Market (e-NAM) expand market access, ensuring fair pricing, while innovations in IoT, blockchain, and renewable energy provide real-time data, clean energy solutions, and digital literacy that bridge gaps in banking, commerce, and healthcare. Livelihood diversification through Farmer Producer Organizations, Self-Help Groups, handicrafts, food processing, and eco-tourism reduces dependence on farming and fosters entrepreneurship, supported by skill development initiatives under the National Education Policy (NEP 2020). Participatory governance, strengthened Panchayati Raj Institutions, evidence-based planning, and gender equity enhance accountability and community resilience, while science-based healthcare interventions improve well-being. Although challenges such as climate vulnerability, resource degradation, fragmented landholdings, and digital exclusion persist, solutions including weather forecasting, rainwater harvesting, cooperative farming, and rural internet infrastructure mitigate risks and expand opportunities. Ultimately, rural transformation must be viewed not only as economic progress but as a process of social justice, ecological balance, and cultural continuity. By empowering communities with knowledge, technology, and

inclusive governance, science ensures that rural areas evolve into resilient, future-ready societies, aligning with the vision of *Viksit Bharat 2047* where rural India stands as a central pillar of national prosperity.

The exhibits/models under this subtheme may pertain to:

- Climate adaptation, renewable energy, cooperative farming, and digital inclusion.
- Smart farming, soil testing, crop monitoring and precision agriculture.
- Rainwater harvesting, groundwater recharge and efficient irrigation systems.
- Drip irrigation, sprinkler systems and solar-powered water pumps.
- Solar, wind, biogas and small-scale hydropower solutions.
- Conversion of cattle dung and agricultural waste into biogas and organic manure.
- Segregation, composting, recycling and conversion of agricultural waste into useful products.
- Improved cook stoves and clean-energy alternatives to traditional fuels.
- Low-cost toilets, wastewater treatment and safe sanitation systems.
- Affordable methods for providing safe drinking water in rural communities.
- Treatment and reuse of household wastewater for gardening or agriculture.
- Technologies and practices for drought, flood and heat-resistant farming.
- Organic farming, bio fertilizers, composting and soil-health monitoring.
- Low-cost processing, preservation, drying and packaging technologies.
- Energy-efficient and solar-powered solutions for reducing post-harvest losses.
- Science-based tools for dairy farming, poultry, fisheries, beekeeping and handicrafts.
- Innovative applications of locally available materials and traditional knowledge.
- Mobile-based agriculture advisories, weather information and digital marketplaces.
- Low-cost diagnostic devices, telemedicine and health-monitoring technologies.
- Eco-friendly, locally available and energy-efficient construction materials and techniques.
- Innovative, affordable and sustainable mobility solutions.
- Early-warning systems and models for floods, droughts, landslides and other rural hazards.
- Scientific methods for animal nutrition, waste management and disease prevention.
- Integration of trees with crops and protection of local biodiversity.
- Converting agricultural and household waste into fuel, manure, materials or other useful products.
- Simple technologies that reduce drudgery and create rural livelihood opportunities.
- Integrated models combining renewable energy, water management, sanitation, agriculture, digital connectivity and waste management.
- Scientific validation and improvement of locally practiced technologies and sustainable practices.

7. Disaster Management

The main Objective of this subtheme is to enhance community awareness, especially among children, regarding disaster preparedness. It promotes a Paradigm shift in Disaster Management i.e., the shift in thinking and focus from a relief-centric approach to a more proactive, holistic and integrated approach for management of disasters.

The model/ exhibits in this subtheme may pertain to:

- Enhancing Information Dissemination and Public Address Systems during disasters is crucial to minimize confusion and chaos.
- Implementing mechanisms to create widespread awareness among the students about handling disaster situations is essential for effective disaster management.
- Extending logistic support and undertaking rescue and rehabilitation during calamities are critical aspects of effective disaster management. It involves pre-positioning of resources such as food, water in disaster prone areas, transportation & distribution, temporary shelter & infrastructure, medical and health services.
- Improving devices for Effective Communication between Emergency Services such as medical, police, military, and administrative bodies is crucial for

enhancing coordination and response during emergencies. enhancing communication devices can improve coordination, response efficiently, and ultimately the effectiveness of disaster management operation.

- Various measures & models for planning, preparedness, and coordination among different agencies are essential for Community Level Preparedness in the event of man-made disasters like gas leaks, nuclear accidents, bombing, explosions, and stampedes.
- Use of geostationary satellites plays a crucial role in providing real time information on meteorological processes, especially floods and storms. They collect meteorological data through various sensors such as infrared and visible radiometers (imagers) which are essential for weather prediction.
- Technologies for forecasting and warning of cyclones, floods, and storms such as Numerical Weather Prediction (NWP) model help forecast the track, intensity and timing of cyclones, floods and storms with increasing accuracy.
- Innovative designs of flood alarms systems such as advanced sensors and Internet of Things (IoT) technology to monitor water levels in rivers, lakes, and flood prone areas in real -time. Machine learning algorithms and artificial intelligence (AI) Models to analyse weather forecast. Similarily, by integrating this innovative design into flood forecasting systems, and cyclone warning networks can enhance ability to anticipate disaster.
- Use of ocean buoys, radars, and ship-based systems in detecting and managing cyclones and other maritime-related disasters.
- Present models for flood prevention such as raised platforms in flood prone areas to provide safe refuge during flood, river embankments, mangrove maintenance by preserve & restore mangrove forests and wetlands to absorb excess water during heavy rainfall, and other mitigation strategies can reduce vulnerability to flooding, protect lives and property and enhance overall resilience to natural disaster.
- Effective Drainage System management to emphasize the importance of "clearing and desilting drains before monsoon seasons to manage stormwater effectively.
- A case study: COVID-19 Pandemic demonstrated the critical need for flexible response strategies, effective risk communication, and coordinated international cooperation in managing health emergencies.
- The disaster management subtheme aims to educate, demonstrate, and innovate various aspects crucial for mitigating the impact of disasters, by promoting awareness, preparedness, and the adoption of advanced technologies. It seeks to foster a proactive approach to disaster management, ensuring safer and more resilient communities.