

**THEME: SCIENCE, TECHNOLOGY AND MATHEMATICS FOR NATION BUILDING.**

**1. Health**

The main objectives of this subtheme are: to bring awareness among the children about the factors affecting our health and nutritional needs of the body; to explore new scientific, technological and bio-medical inventions in prevention and cure of diseases; to explore various scientific and technological interventions for meeting nutritional requirement of human beings and innovative ideas for better management.

The exhibits/models in this subtheme may pertain to:

- factors affecting the health and resulting ailments in the body;
- infectious and non-infectious diseases, relationship with causative factors and their sources;
- innovative preventive measures to control diseases at different levels/roles of various agencies;
- demonstration and use of traditional methods of medication;
- demonstration of known facts and findings, and health benefits of Yoga;
- role of biotechnology improved crops and nutrition;
- demonstration of models/ projects to show the effect of junk food items, adulterated food items on our body and its preventive measures;
- model to demonstrate importance of balanced diet and nutritional values of various food items;
- 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;
- ways to raise awareness and sensitise people to be careful in health matters, explore the possibilities and make use of the facilities available;
- innovative ideas for effective implementation of policies/ programmes/ schemes such as Swachh Bharat Abhiyan, National Leprosy Eradication Programme etc that have significant impact on health.
- development of knowledge-base and understanding new scientific, technological aids in bio-medical areas;
- presentation of known facts and research findings in different medical systems like Traditional, Modern, Homeopathy, Ayurvedic etc.;
- lifestyle and its relationship with good and bad health based on known facts and researches;
- mechanisms/ways to control the spread of epidemics such as Dengue, Malaria etc.
- improved methods of sanitation and appropriate technology for waste disposal, both biodegradable and non-biodegradable;

- common prophylactic measures available and advantages of inoculation and vaccination;
- need for appropriate measures for family planning and welfare;
- ideas for developing low-cost nutritious food;
- low cost medical diagnostic and therapeutic tools;

## **2. Industry**

The objective of this sub-theme is to help children: to understand the importance of science and mathematics in various types of industries; to think of ways and means to increase its efficiency leading to production of different kinds of goods to meet the future needs of the growing population at affordable price.

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

- models showcasing improved versions of various types of machines and manufacturing plants;
- design and development of automatic devices for various applications in industries;
- schemes/designs to help reduce production cost and conservation of raw materials;
- roles and possibilities of the service industries like tourism, banking, Information and Communication Technology etc. for inclusive development;
- devices or methods that measure and control pollution;
- devices/methods to minimise the effects of chemical spills, solid waste, nuclear waste and radiations, etc from industries/ nuclear plants, etc;
- awareness about various aspects of environment and disposal of harmful effluents, solid waste, nuclear waste etc;
- use of innovations/improvements that may help in increasing production in various industries, such as textiles, engineering goods, machine tools, chemicals, drugs and pharmaceuticals including life-saving drugs, vaccines and devices and ecofriendly plastics, etc. to improve the quality of life;
- improved/ indigenous design/ working models of devices which may be used on small scale for production/manufacturing of utility items of daily life;
- indigenous/ innovative techniques for exploration/ conservation/ recycling/ processing of minerals and other natural resources;
- working models to demonstrate equipment/processes/devices/ technologies/ designs, which may help facilitate the domestic work.
- improved/improvised/innovative technologies associated with weaving, pottery, metal work, dyeing, printing and other crafts practiced in cottage industry and suggestions for new designs;

### **3. Transport and Communication**

The objectives of this sub-theme are:- to make general public and children understand different types of transport modes and communication as well as the importance of transport and communication for Nation Building; to make them aware about the issues and concerns of the present transport and communication system and to promote innovations for efficient transport and communication system.

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

- improvised/Indigenous models for efficient transport and fast communication especially mobile and internet for communication in rural areas;
- working models of fuel efficient/ pollution-free designs of automobiles /other vehicles;
- innovative ideas for efficient management of road, rail, water and air transport systems, e.g. better safety measure, especially unmanned railway crossings checking/control of pollution, providing immediate relief to accident victims, managing traffic jams, etc;
- working models of printing technology - communication with graphics and multi-media and low-cost methods;
- working model of efficient transport system in metropolitan/ urban and rural areas;
- demonstrating the principle and functioning of modern devices of communication;
- designs for making existing operation of communication more efficient;
- demonstrating the use of information technology in developing improved designs/ indigenous designs/devices, which may be used on a small scale for production/manufacturing of utility items of daily use;
- developing innovative designs/ models of multimedia equipments/materials and packages for the children with special needs, especially with visual and audio impairment;
- technologies of emerging web designs/effective use of ICT for knowledge retrieval & sharing;
- improvised/improved devices for effective transport and communication between various emergency services, namely medical, police, military and other administrative bodies/committees;
- use of geo-stationary satellites in providing information pertaining to vehicular movements and transportation, disaster management, etc;
- emergency mechanisms and mobilization technologies in communication and transportation systems etc;
- Innovative methods to reach online communication facility to the remote areas;
- Importance of safe and secure communication in digital world.

#### **4. Innovations in renewable resources for sustainable environment**

This area is expected to make children think of various ways and means for making efficient use of available resources and also new techniques/methods of conservation and management of resources for sustainable environment.

The exhibits/models in this subtheme may pertain to:

- plans for proper management of resources and its monitoring;
- restoration of degraded areas and habitat of natural biodiversity;
- ecological studies of plants and animals;
- efficient methods of harvesting and preserving marine resources;
- schemes/designs to help reduce production cost and conservation of various raw materials;
- sustainable land use practices/ ecologically sustainable farming methods;
- recycling of water, materials, solid wastes, etc;
- devices/methods that control air/water/land pollution and technologies to manage them;
- stopping depletion of essential micro nutrients in the soil;
- forest, river, mangrove, wetland conservation and management;
- desilting and renovation of ponds, tanks and reservoir;
- self regulating water harvesting system/rainwater harvesting and storage in a manner that evaporation and transportation losses are minimised;
- participatory watershed development and management;
- development of low cost technology for producing potable water;
- sea water use along the coastal area for raising mangrove and *salicornia* plantation together with agriculture;
- innovative/improvised designs for reducing waste in extraction and processing of minerals;
- innovative methods of exploration and preserving minerals and crude oil, etc;
- cost effective heating and cooling system of buildings, etc.;
- models to control loss of natural resources due to mismanagement/ disasters, etc.

#### **5. Innovations in Food Production and Food Security**

The main objectives of this sub-theme are:-to make children and teachers aware of various techniques/methods to enhance agricultural production to achieve food security; to make children and teachers think of various ways and means to enhance knowledge on food production and food security.

The exhibits/models in this subtheme may pertain to:

- effect of climatic change on agriculture and its mitigation and adaptive techniques/methods;
- preservative and conservative methods for prevention of soil degradation and judicious use of water;

- conventional biotechnology practices e.g., application of biotechnology, microbiology and genetic engineering to agriculture for improved yield.
- organic farming/organic fertilisers versus chemical fertilisers;
- planning and managing energy crops (*Salix*, Poplar, *Jatropha*, Jojoba, etc.);
- use of biotechnology for economically and ecologically sustainable biofuels;
- various pestcontrol and management measures;
- application of biotechnology and genetic engineering in improving animal breeds and production of animal products that are used as food;
- innovative/inexpensive/improved /indigenous technologies/ methods of storage/preservation/ conservation/ transport of agricultural products and food materials;
- innovative/improved practices for reducing cost of cultivation;
- identification of medicinal plants and their applications;
- indigenous designs of farm machinery, agriculture implements and practices;
- impact of pollution on food and food safety and measures/ methods for ensuring food safety;
- improved/improvised method of processing, preservation, storage and transport of food products;
- issues related with the animal health and food security;
- food production and demand of quality food and food security;
- nutrition education/healthy eating habits and food utilization by body;

## **6. Mathematical solutions in everyday life**

The main aim of this sub-theme is to make our school children and teachers aware and realise about various mathematical ideas and tools to solve problems confronting the society thereby leading to a quality life.

The exhibits/models in this subtheme may pertain to;

- policies, programmes and schemes in mathematics that have a significant impact on human life;
- mathematical applications that have a wide ranging impact on issues such as agriculture, energy, health, environment, space, industry, communication, education, etc.;
- effective and efficient ways of communicating an experiment that revolutionize mathematical ideas;
- cost effective demonstration of known facts and research in mathematics;
- impact of mathematical ideas on other subject areas such as science, medicine, psychology, social science etc;
- contribution of mathematics for economic growth, mass literacy, eradication of poverty and malnutrition, etc.
- mathematical ideas to solve various problems of our everyday life/environment related problems;

- mathematical models to predict orbital path of comets, meteors and other minor planets;
- mathematical models to show how disease might spread in human in the event of epidemics/ bioterrorism;
- mathematical models to predict the devastating effects of wars/ nuclear explosions;
- mathematical models to show spread of forest fire depending on the types of tree, weather and nature of the ground surface;
- mathematical models to demonstrate the action of medicines in human system;
- using mathematical tools and computer simulation to improve cancer therapy/wound healing/ tissues formation/corneal wound healing;
- mathematical tools to describe traffic flow/stock market option;
- mathematical tools to show the effect of climate change/global warming;
- mathematical tools for predicting future population and knowing the impact of population;