The Joy of Science
Innovative Programmes and Material for Science Education

Annual Report
2009-10
Dt. 01-10-09

MESSAGE

The history of our glorious ancient India is a history of thousands of years of culture and progress. However, we talk about ‘Culture’ and ‘Spiritualism’ when we talk about India, we are hardly aware of its scientific heritage. We accept that scientific knowledge and technology are the domains of the west. It is but-fact that India never lacked in scientific tradition, but what we ignored was ‘Documentation’. That’s why India failed to emerge as a leading ‘Scientific & Technological Developed nation’.

However, it must be remembered that our scientific tradition didn’t leave any field untouched, from abstract mathematics to solid engineering, we have a powerful scientific tradition. What is needed is to expose and explore.

I am pleased and feel proud to know that a unique science-exhibition on wheels ‘SCIENCE EXPRESS’ has been instrumental in creating awareness about the science and technology. The Phase-III of the Science Express will be launched on GANDHI JAYANTI, 2nd Oct. 2009 from GANDHINAGAR.

My heartiest compliments to the Vikram A Sarabhai Community Science Centre for co-ordinating and managing this wonderful exhibit.

(Narendra Modi)

To,
Shree Dilip Surkar,
Executive Director,
Vikram A Sarabhai Community Science Centre,
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Ahmedabad-380 009.
e-mail : dilip.surkar@vascsc.org

Narendra Modi
Chief Minister, Gujarat State
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2009 -10
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My hearty congratulations and compliments to the Vikram A Sarabhai Community Science Centre (VASCSC) for popularizing science and making it accessible to all strata of society through its innovative activities and programmes, which is a big accomplishment.

The Centre has reached out to millions of people across India, especially through prestigious projects like Science Express. Now is the time to reach out even further and make the big leap. The Centre needs to network and collaborate with the science centres across the world! To promote innovations, we need to set up an 'Innovation Cell' and we can propose this idea to other science centres. The Centre can also use its expertise to guide new science centres not only in India but also in other developing countries. It can also start its work in direction of setting up science activity centres at places where such a facility is lacking. We need to develop linkages with lots of other global institutions that do similar things.

The Centre is now doing well and is in a situation where it is witnessing an increase in its activities which are also scaling up. We have to now prepare a plan to target for growth of 20-25% a year and take the plunge forward in this direction. The Centre’s team needs to think big in terms of being creative; exploring new and offbeat ideas; and putting them to innovative use to ensure its smooth functioning.

The talent at the Centre needs to be multiplied to see the big growth. The team needs to be expanded, besides reaching out to more people. We can bank upon our existing programmes, kits and TLM. We can disseminate them more with innovative marketing. We can upload them on the website for sale. We need to find resources to expand and not to make profit. VASCSC has a unique opportunity to create packages to train a large number of science teachers and also to employ science to help understand and solve the problems of millions of people.

Internet access has brought information from across the world to individual hands. I wish VASCSC could have more web and virtual presence. We have to find ways to make the best use of this resource by putting up interesting information on the web and reaching out to more and more people. It is one area the Centre could focus on, to push the spread of science education even further. We essentially need to focus on expansion, reaching out and innovation.

I would like to congratulate the Centre on the success of the Science Express, which is traveling around the country and spreading scientific temper and for the successful execution of the core activities. I would like to thank the enthusiastic team at the Centre for their hard work and support. I would also like to take this opportunity to thank the board members, the management of the centre, and most of all, the thousands of children who give VASCSC the reason to strive further.

Sam Pitroda
Chairman
Board of Governors, VASCSC
“Equipped with their five senses, humans explore the universe around them and call the adventure - Science.”

Vikram A Sarabhai Community Science Centre (VASCSC) has carved the way for a number of students, teachers and the community in their pursuit of the adventure called science. VASCSC, during the year 2009-10, continued its activities successfully and expanded its reach to people across the entire country.

The Science Express successfully completed its second tour of India and received a tremendous response from all quarters. The third phase was launched with exciting updates and addition to the existing content. An entire coach on ‘Climate Change’, sponsored by HSBC and Earth Sciences Forum, was also included. The Science Express has played a major role in reaching out to people across India, creating scientific temperament, encouraging students to take up education and career in science and has surpassed all previous records. We are thankful to NCSTC, Department of Science & Technology, Govt. of India for giving us an opportunity to partner with them for management of this prestigious national project.

With the project ‘Space Education for Schools and Communities’, supported by Indian Space Research Organization (ISRO), we have been conducting space education activities in different parts of Gujarat, through the space education cells set up at various places. With Gujarat Energy development Agency’s (GEDA) Bal Urja Rakshak Dal (BURD) programme, we reached out to students in Ahmedabad and spread the message of energy conservation.

The radio has been a powerful medium of mass communication, reaching out to major part of our country’s population. Our programmes with All India Radio (AIR) and Gyan Vani educational channel helped in creating an awareness and interest in science amongst the masses. Transadaptation of Vigyan Prasar’s scripts on Nirakh ne gagan ma… for broadcast on AIR helped us reach audience in even remote areas.

The Centre, in its role as the State-level Resource Agency for the GUJCOST Science Club initiative, was instrumental in developing the content and orienting the science centres for setting up 1000 science clubs across Gujarat, in the pilot phase. An orientation programme for science centres on how to create and run these clubs was conducted. New material like a science club diary and guidelines for setting up and running the clubs was developed.

We take this opportunity to specially thank the Education Department, Govt. of Gujarat for the crucial financial support, which has made it possible for the Centre to run its Core Programmes during this year, coinciding with the Swarnim Gujarat celebrations.

We are thankful to the Juniper Networks Foundation Fund, USA for their grant, which was helpful in upgrading our lab facilities and basic infrastructure.

We would like to thank all our well-wishers for their continuous support to our programmes. We hope to enthusiastically continue our efforts in popularizing science and promoting hands-on approaches of science teaching and learning.

Dilip Surkar
Executive Director
VASCSC
Introduction

Vikram A Sarabhai Community Science Centre (VASCSC) is a pioneering Community Science Centre which aims to nurture young minds and direct them towards scientific thinking with methods and techniques which make the process of enquiry and learning a fun-filled, enjoyable and lasting experience.

The Centre’s mandate of spreading the joy of science by reaching out to different segments of the community is best illustrated by its logo. The five arrowheads in the logo represent groups comprising teachers, students, research workers, administrators and the community while VASCSC is represented by 'Delta'- the mathematical symbol of change. VASCSC aims to bring about change by providing a common platform to all these groups. In 1963, India’s renowned scientist Dr. Vikram A. Sarabhai founded the Community Science Centre to encourage scientific thinking and innovative science teaching. After the untimely death of Dr. Sarabhai in 1971, the Centre was renamed as the 'Vikram A Sarabhai Community Science Centre', to associate its name with that of its founder.

The core of the Centre's philosophy is to take school and college students out of the rigid framework of textbooks and encourage them to think, explore and create. Over the years, the Centre has combined formal and non-formal techniques to formulate many innovative methods to give students a better understanding of Science and Mathematics, which not only make the process of learning enjoyable but also sustained and long-lasting.

Core activities of the Centre

The core activities of the Centre are developed to inculcate scientific temper in the community through its innovative programmes and teaching methods. These activities aim at demystifying science and exploring its intellectual and practical dimensions. The following activities comprise the core activities:

- School Science Programme
- Capacity Building
- Outreach Programme
- Special Programmes
- Mobile Science Programme
- Publications
- Networking
School Science Programme targets schools especially schoolchildren and teachers. Fundamentals in Science and Mathematics are made clear to the students using activity, exploration and investigation. The heaviness of current mode of teaching is made light and fun-filled through hands-on activities. Feedback received from this group is critical to gauge the impact of the Centre's activities.

School Science Programme includes:
1. Open House
2. School Visits
3. Student Visits
4. Summer Programme
5. Annual Programme
6. Annual Events

Overall 43,724 visitors were recorded at the Centre during 2009-10.

1. Open House
The Centre and its facilities are open to one and all. Open House programme has given an opportunity to children, teachers and even laypeople interested in science and mathematics, to explore its various facets independently and with guidance from educators at the Centre. Visitors take the maximum benefit of the Centre's facilities through the Open House programme. The Centre's Quadrangle space; different laboratories viz. Biology, Physics, Chemistry, Computers, Electronics, Model Rocketry, Mathematics; and the Science Playground are freely accessed by people of all age groups, especially on Sundays, as a part of this programme.

A collection of interactive exhibits, models, teaching aids and experiments are showcased in the Quadrangle and laboratories. Besides, children and teachers perform investigatory activities on their own in the labs. These activities include experiments from their school curriculum as well as participants' own ideas, facilitated by Centre’s trained educators. 13,340 students, teachers and others were recorded in the Open House programme of this year.

2. School Visits
This programme has been developed to cultivate scientific temper among schoolchildren and emphasizing that 'Science is fun'. This programme is conducted during weekdays for school groups visiting the Centre. Several exciting experiments, demonstrations, science shows, lab visits, movie shows and fun activities are integrated in this programme. A team of educators conducts this programme and facilitates their visit. They are introduced to the activities of the Centre and
encouraged to participate in its regular programmes. Many a times, interesting takeaway material is also provided to the children and the teachers accompanying them. 1850 students and 974 teachers from 204 schools visited the Centre during the year as a part of the School Visit programme.

3. Student Visits

The Centre’s laboratories are equipped to conduct a number of school and college level experiments. A number of students utilize the lab facilities to perform curricular and also, extra-curricular experiments. Necessary guidance is also provided to students for their school projects, science fair projects and for trying out innovative ideas. 3700 students from different schools performed curriculum-based experiments and projects at the Centre’s laboratories. Guidance was provided to around 2450 students, 310 teachers and 1400 other people regarding activities of the Centre, projects, science fairs, etc.

An illustrative list of experiments & activities conducted at the Centre during Open House, School Visits & Student Visits, is given as follows:

- Observing unicellular organisms using compound microscope
- Study of various parts of a plant
- Experiment on the release of oxygen during photosynthesis
- To understand the process of evaporation
- Experiment on the release of carbon dioxide during respiration
- To understand structure of human body
- Study of algae, Study of fungi
- Study of contaminated water
- To study the various parts of the flower (Dhatura and Jasud)
- To observe the temporary slide of blood
- Study of the adaptations in creepers
- Study of the adaptations in birds
- Dissection of maize leaf
- Study of Osmosis
- Experiments with convex lens
- Microscope - making from match box
- Making sand clock and water clock
- Measuring time of oscillations of a simple pendulum
- To show that medium is required for propagation of sound
- To show that air has mass and measuring lung power
- To prove that light travels in a straight path
- Effect of magnetic poles
- To observe that length of an object increases on heating
• Conduction of heat in solids, liquids and gases
• To observe the effect of temperature on different substances
• Making periscope and kaleidoscope
• Experiments with curved mirrors
• To demonstrate the mutual effect of like and unlike charges
• Electrolysis of water
• Separation of substances
• Volcano
• Magic filtration
• Detecting adulteration in food
• Testing of food samples
• Properties of soil
• Knowing laboratory apparatus
• Understanding elements
• Writing with water
• Studying pH of different samples
• Neutralization reaction
• Properties of acid and base
• Explanation of atomic orbitals
• Making valency cards
• Preparation of SO₂ gas and studying its properties
• Battlefield in a test-tube
• Writing with fire
• Understanding chemical reactions, types of chemical reactions
• Redox titrations, Acid-base titration
• Test for functional groups present in organic compounds
• Qualitative analysis of inorganic salts
• Knowing reactivity series
• Secret message
• Writing without ink
• Dancing ball
• Fire and water
• Magic Bottle
• Flame test
• Preparing some hydrocarbon structures
• Make your own firecrackers
• Cold welcome
• Blow a balloon

• Chemical filtration
• Change of colour on ringing a bell
• Funny Colour
• Rainbow Colour
• Magic Water - Wine - Milk - Beer
• Obedient Colour
• Making Fluorocains
• Sugar Charcoal
• Lemon Cell game
• Preparation of oxygen, chlorine, CO₂ gas
• Magic Breath
• Black Snake
• Making Colour Flask
• Dancing Sodium

Students are provided guidance for school projects which include the following:

Projects in Physics

• Study of Newton's rings
• To study the various factors affecting the focal length of liquid lens
• To study the effectiveness of different detergents in terms of quantity and quality
• To study various factors on which internal resistance of the cell depends
• To determine the effect of temperature on commonly used dry cell
• To find the wavelength of sodium using Young's double slit
• To find resistance of the given material by Ohm's law
• To study the projected motion of a liquid set under water condition
• To study the refractive index of the given prism
• To study the dependence of the internal resistance of primary cell on any one of the variables
• To measure refractive index of various liquids using a round-bottomed flask
• To find the wavelength of red LASER beam using spectrometer
• To find the horizontal component of Earth's magnetic field
• To study the factors upon which the time period of a simple pendulum depends
• To study the effect of moisture on hair
• To study the effect on the force of attraction between a solenoid and a bar magnet for different values of current
• To study change in refractive index due to temperature
• To determine the cleansing effect of detergents by comparing their surface tension
• To verify the laws of combination of resistances both in series and parallel connections
• To study the length dependence of the resistance
• To determine the wavelengths of prominent lines of mercury by plain diffraction grating
• To study the effect of heat and temperature on Ohmic conductor
• To measure chemical equipment of copper
• To study the relationship between real and apparent depth using the spherical mirror and various liquids and to find the refractive index of the liquids
• To prove that the ratio of Earth's horizontal, magnetic strength of magnet is constant
• To find out the refractive index of different materials using a hollow prism
• To prove that angle between reflected and refracted ray from monochromatic light is 90°
• To measure Young's modulus of given wire

• To construct a thermocouple and to calibrate it
• To study the characteristics of a transformer
• To produce electricity by chemical reaction
• To study the coefficient of apparent expansion of liquid
• To estimate the order of magnitude of the size of Oleic acid molecule
• To study the effect of temperature on the resistance of semiconductor diode
• To study the response of a photoconductor cell to intensity of incident light

• To find the metallic conductance of NaCl
• To investigate whether the energy of a simple pendulum is conserved
• To separate different bodies as Ohmic or non-Ohmic conductor
• To determine and compare the unknown R and r of the different wires
• To study effect of different materials on boiling

Projects in Chemistry
• To find out the nutritive value of cold drinks
• To analyze the sample of toothpaste qualitatively
• To analyze sample of brass qualitatively
• To prepare dye and dyeing of fabrics by using azodyes
• To prepare formaldehyde plastic and amine aldehyde
• To study effect of metal coupling on rusting of iron
• To prepare potash alum from scrap aluminum
• To prepare iodex
• To compare the rates of evaporation of water, acetone and chloroform
• To prepare Phenolphthalein
• Estimation of Vitamin-C in fruit juices
• Determination of molecular mass of urea by elevation of boiling point of water
• To study adulteration in food samples
• To study various contents in some fruits and vegetables.
• To test the presence of nickel in some common chocolates
• To prepare Nylon-52 (synthetic plastic)
• To prepare rayon threads from filter papers using cuprammonium process
• Determination of dosage of bleaching powder for disinfection of various water samples
• To compare the foaming capacity of different samples of soaps
• Analyzing tea samples for amount of polyphenols, tannic acid and caffeine
• To study the effect of addition of non-volatile solute to a volatile solvent
• To analyze the given sample of commercial antacids by determining the amount of HCl they can neutralize
• Qualitative analysis of coins
• To study the effect of temperature on the rate of diffusion of solid in liquids
• To determine the amount of chlorine in different samples of water
• To study the quantity of casein present in different samples of milk
• Analysis of soil
• To determine hardness of water
• Chromatography
• To analyze some fruit and vegetable juices for the contents present in them
• To study the presence of insecticides/pesticides (nitrogen-containing) in various fruits and vegetables.

Projects in Biology
• Adsorbant chromatography
• Analysis of fruits & vegetable juices (pH, starch, minerals, sugar, protein & vitamin content)
• Analysis of proteolytic enzymes (Pepsine & trypsin)
• Analysis of soil samples (profile, water holding, chemical analysis, microorganisms)
• Analysis of urine sample (sugar, bile salts, microorganisms, albumin, urea)
• Dissection of earthworm, cockroach
• Comparision of photosynthesis rate in different lights, light intensity, dissolved salts, carbonate concentration
• Effect on seed germination in acidic, basic and neutral condition or medium
• Effect of Urea, NPK, cowdung on seed germination
• Effects of salts on monocot and dicot seed germination/length of root - shoot developed
• Finding the optimum pH for protease enzymes
• Hydrolysis of sucrose by the enzyme invertase
• Isolation of a casein from milk sample
• Isolation of chloroplast and studying the photosynthetic activity
• Medicinal value of neem tree & antifungal properties of its leaf extract
• Microscopic and macroscopic study of hydrophyte and mesophyte plants (sections of leaf, stem, root, stomata)
• Microscopic study of nitrogen-fixing bacteria
• Microscopic study of stomata in upper surface and lower surface of leaves of various plants (monocot, dicot, vegetables, fruits, herbs, xerophytes, hydrophytes)
• Microscopic study of various bacteria
• Paper chromatography of plant pigments
• Paper electrophoresis for separation of proteins
• Study of air flora of various locations
• Study of bacteria present in interspaces between teeth
• Study of coaguble and non-coaguable proteins in various samples of milk
• Study of drug resistance bacteria using antibiotics
• Study of human blood cells
• Study of pollen grains and optimum sugar condition required for germination of pollen tube in various plants
• Study of skin flora
• Study of various algae
• Study of soil micro organisms (planktons, bacteria, fungus)
• Study of various fungi
• Study of zooplanktons and microorganisms from fresh water or pond
• To observe granulated bacteria from curd sample
• To show anaerobic respiration by yeast and to test its end product for alcohol or carbon dioxide and energy
• To study the acidity in different stages of ripening of tomatoes

• Extraction of DNA from onion or banana
• Xerophytic plant adaptation - external and internal structure (cactus leaf, stem, root)
• Fermentation

Projects in Electronics
• Automatic room light system
• Door watching alarm
• Basic gates: AND, OR, NOT

• Fire alarm, Vibration alarm
• Water level indicator
• Electronic eye
• Clap switch
• Remote control musical bell
• Musical doorbell, Infrared-based bell
• Amplifier
• FM receiver
• Full wave rectifier, Half wave rectifier
• Liquid sensor
• Variable power supply, Fixed power supply
• Flasher, Buzzer
• Dancing lights, Running lights
• Automatic car parking light
• Water level indicator with display
• Traffic signal
• Mechanical robot
• Digital security system
• IR bell
• Listening bug
• Entry counter
• Electronic harmonium
4. Summer Programme

The Summer Programme is conducted during the summer vacations. This programme is extremely popular, with a large number of children joining one or more of the modules offered in it. These modules are developed to initiate the participants into the subjects of science, mathematics and computers through hands-on activities. This way, the children can utilize their vacation time constructively and try their hands at activities based on astronomy, biology, chemistry, computers, electronics, mathematics, model rocketry and physics. The Summer Programme was conducted during 21 April - 06 June 2009.

Besides children aged 4 years and above, some modules were also developed for parents and teachers. The programme schedule was compiled in the form of a brochure which was freely distributed to ensure wide dissemination of information and greater participation. Exciting new programmes like Mathematics beyond classroom, Life skills, Robotics and Journey of a book (Pr. Jr.) were introduced, offering more choice to the participants.

127 batches of 36 different modules were launched. 2500 participants registered for one or more of these modules.

The list of the modules offered under Summer Programme is given in the following table:

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<thead>
<tr>
<th>Module</th>
<th>Activities</th>
<th>Age Group</th>
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</thead>
<tbody>
<tr>
<td><strong>Science Hobby Workshop</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do it Yourself - I</td>
<td>Windmill, Windwheel, Flying fish, Running wheel, Spacecraft, Whirling fan,</td>
<td>6 - 9 years</td>
</tr>
<tr>
<td></td>
<td>Boomerang cross, Acrobatic casule, Clap in the air, Parrot in the cage, Heat kit</td>
<td></td>
</tr>
<tr>
<td>Do it Yourself - II &amp; III</td>
<td>Introduction of tools &amp; techniques, Measurement &amp; scale, Periscope, Lens</td>
<td>9 + years</td>
</tr>
<tr>
<td></td>
<td>camera, Revolutionary motor, Giant yo-yo, Kaleidoscope, Stroboscope, Jig-saw puzzle, Angles between mirrors</td>
<td></td>
</tr>
<tr>
<td><strong>Mathematics Lab</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Programme for Parents</td>
<td>Guidance regarding teaching mathematics effectively to their children</td>
<td>-</td>
</tr>
<tr>
<td>Programme for Primary Teachers</td>
<td>Guidance regarding teaching mathematics effectively to their students</td>
<td>-</td>
</tr>
</tbody>
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Vikram A Sarabhai Community Science Centre
<table>
<thead>
<tr>
<th>Module</th>
<th>Activities</th>
<th>Age Group</th>
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</thead>
<tbody>
<tr>
<td>Programme for Secondary Teachers</td>
<td>Guidance regarding teaching mathematics effectively to their students</td>
<td>-</td>
</tr>
<tr>
<td>Fun with Maths - Jr.</td>
<td>Enjoy the learning of mathematics through activities</td>
<td>7 - 9 years</td>
</tr>
<tr>
<td>Fun with Maths - Sr.</td>
<td>Learning mathematics through activities, games &amp; puzzles</td>
<td>10 - 12 years</td>
</tr>
<tr>
<td>Mathematics beyond classroom</td>
<td>Activities involving fun, logic and application of mathematics</td>
<td>13 -15 years</td>
</tr>
<tr>
<td>Learning Abacus</td>
<td>Learning abacus basics: addition, subtraction, multiplication, division</td>
<td>12+ years</td>
</tr>
</tbody>
</table>

**Computer Lab**

<table>
<thead>
<tr>
<th>Module</th>
<th>Activities</th>
<th>Age Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fun with Computers</td>
<td>Educational programmes and educational games</td>
<td>4 - 8 years</td>
</tr>
<tr>
<td>Picture Creating and Editing</td>
<td>MS Paint, Photoshop, Image Scanning</td>
<td>10 - 12 years</td>
</tr>
<tr>
<td>Web Designing</td>
<td>Hyper Text Markup Language, Still Image, Simple animation, website uploading</td>
<td>12+ years</td>
</tr>
<tr>
<td>Computer Basics</td>
<td>MS Windows, MS Office (Word, Excel, Powerpoint), Internet</td>
<td>12+ years</td>
</tr>
<tr>
<td>LOGO</td>
<td>Programming language for children (geometrical designs)</td>
<td>8 - 10 years</td>
</tr>
<tr>
<td>Computer Basics (Women Special)</td>
<td>MS Windows, MS Office (Word, Excel, Powerpoint), Internet</td>
<td>-</td>
</tr>
</tbody>
</table>

**Biology Lab**

<table>
<thead>
<tr>
<th>Module</th>
<th>Activities</th>
<th>Age Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microscopic Exploration</td>
<td>Microscopy is part of science textbook from std. 5 - 12. Children will learn the basics of microscopy and explore the invisible world around us.</td>
<td>10 -12 years</td>
</tr>
<tr>
<td>Life Skills</td>
<td>An educational programme that would make children capable of taking right steps to reduce pain, injury and even save life in the event of accidents</td>
<td>10 -12 years</td>
</tr>
<tr>
<td>Little Scientist</td>
<td>A child in nice and simple ways through experiments will work and learn science like a (little) scientist</td>
<td>10 - 12 years</td>
</tr>
<tr>
<td>Model Making</td>
<td>An enjoyable learning experience where by children make different science models</td>
<td>12 - 14 years</td>
</tr>
<tr>
<td>Parents' Programme</td>
<td>An interactive programme that gives useful tips to parents to help their children learn science</td>
<td>For parents of Std. 5-7 students</td>
</tr>
<tr>
<td>Nature Trail</td>
<td>A learning experience that will allow children to come closer to nature through a planned walk in our surrounding</td>
<td>9 - 11 years</td>
</tr>
</tbody>
</table>

**Physics Lab**

<table>
<thead>
<tr>
<th>Module</th>
<th>Activities</th>
<th>Age Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics with Fun</td>
<td>Hands-on models on Colour, Light, Heat, Electricity, Magnetism, etc.</td>
<td>11 - 13 years</td>
</tr>
<tr>
<td>Know our Universe</td>
<td>Hands-on models on eclipses, rotation, revolution, time measurements, using a telescope, etc.</td>
<td>12 - 14 years</td>
</tr>
<tr>
<td>Module</td>
<td>Activities</td>
<td>Age Group</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td><strong>Model Rocketry Lab</strong></td>
<td>Fabrication and launching of Single Stage Model Rockets</td>
<td>12 - 14 years</td>
</tr>
<tr>
<td><strong>General Science</strong></td>
<td>Microscopy, making a magic box, chemistry &amp; physics experiments, maths puzzles, astronomy for beginners, weather vane &amp; compass, making a flip book &amp; book mark, science talk, educational visit</td>
<td>Std. 5 - 7</td>
</tr>
<tr>
<td><strong>Electronics</strong></td>
<td><strong>Electronics for You</strong> Water Level Indicator, Listening Bug, Infra- Burglar Alarm</td>
<td>10 - 12 years</td>
</tr>
<tr>
<td></td>
<td><strong>Electronics World</strong> Water Level Indicator with display, 2 digit entry counter, traffic light system</td>
<td>13 - 15 years</td>
</tr>
<tr>
<td></td>
<td><strong>Robotics</strong> Make your own mechanical robot</td>
<td>13 - 15 years</td>
</tr>
<tr>
<td><strong>Chemistry</strong></td>
<td><strong>Fun with Chemistry</strong> Analysis of food particles, sublimation, element-mixture-compound, reaction of metals, making carbon dioxide and oxygen gases, acid-base-salt, neutralization by titration, separation of substances</td>
<td>9 - 12 years</td>
</tr>
<tr>
<td></td>
<td><strong>Chem 4 Kids</strong> Introducing laboratory &amp; equipments, tricks of chemicals, volcano, burning a rupee note, battlefield, elephant's toothpaste, magic filtration, chemical filtration, colour separator, magic bottle, cold welcome, invisible message, writing with fire and water</td>
<td>5 - 8 years</td>
</tr>
<tr>
<td></td>
<td><strong>Chemistry Hands-on</strong> Types of chemical reactions and equations, preparation of sugar charcoal and lamp black, metals and non-metals, reactivity series of metals, structure of atom, making chemical formulae and balancing equations, educational visit</td>
<td>13 - 15 years</td>
</tr>
<tr>
<td></td>
<td><strong>Fundamental Practical Chemistry</strong> Conceptual background of salt analysis, easy methods for detection of cations, anions and functional groups present in organic compounds, volumetric analysis</td>
<td>16 - 17 years</td>
</tr>
<tr>
<td><strong>Library</strong></td>
<td><strong>Journey of a Book (Pr. Jr.)</strong> Make your own book, story viewing and other creative activities about reading books and using library</td>
<td>6 - 7 years</td>
</tr>
<tr>
<td></td>
<td><strong>Journey of a Book (Jr.)</strong> Presentation, Thumb printing, Book shop visit, Book mark making, Story-writing, Making your own book and cover</td>
<td>8 - 10 years</td>
</tr>
<tr>
<td></td>
<td><strong>Journey of a Book (Sr.)</strong> Presentation, Book shop and Printing Press visit, Book mark making, Book Review, Make your own Book, Story/article writing</td>
<td>11 - 14 years</td>
</tr>
</tbody>
</table>
5. Annual Programme

The Annual Programme consists of modules conducted around the year. It also includes clubs like the Physics, Chemistry, Model Rocketry and Saturday Science Forum, which are popular among children.

This approach of putting together all the modules being conducted at the Centre, was useful in streamlining the various short-term programmes conducted throughout the year. A brochure was printed and freely distributed for ensuring better participation. 117 batches of 47 different modules were launched.

The different modules conducted in the Annual Programme during 2009-10 are as follows:

<table>
<thead>
<tr>
<th>Module</th>
<th>Activities</th>
<th>Age Group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mathematics Lab</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maths Made Easy - Jr.</td>
<td>Understanding mathematical operations and concepts like</td>
<td>7 - 9 years</td>
</tr>
<tr>
<td></td>
<td>fractions, factors, multiples by hands-on activity</td>
<td></td>
</tr>
<tr>
<td>Maths Made Easy - Sr.</td>
<td>Understanding mathematical concepts like HCF-LCM, integers</td>
<td>10 - 12 years</td>
</tr>
<tr>
<td></td>
<td>and concepts in Geometry</td>
<td></td>
</tr>
<tr>
<td>Do and Understand</td>
<td>Understanding and making mathematical models</td>
<td>13 - 15 years</td>
</tr>
<tr>
<td><strong>Computer Lab</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Teachers’</td>
<td>Syllabus of Std. 8, 10, 12 ‘Introduction to Computer subject’</td>
<td>Teachers &amp; students of Std. 8, 10, 12</td>
</tr>
<tr>
<td>Training Programme for Std. 8, 10, 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Teachers’</td>
<td>Syllabus of Introduction to Std. 9, 11, 12 ‘Introduction to Computer subject’</td>
<td>Teachers &amp; students of Std. 9, 11, 12</td>
</tr>
<tr>
<td>Training Programme for Std. 9, 11, 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course on Computer Concept (CCC &amp; CCC+)</td>
<td>Syllabus of CCC &amp; CCC+</td>
<td>Teachers &amp; govt. employees</td>
</tr>
<tr>
<td>Web Designing</td>
<td>HTML, still &amp; motion picture and sound file, Uploading</td>
<td>12+ years</td>
</tr>
<tr>
<td>Computer Basics for all</td>
<td>MS Paint, Word, Excel, Powerpoint, Windows, Internet (e-mail, surfing)</td>
<td>12+ years</td>
</tr>
<tr>
<td>Computer Basics for Women</td>
<td>MS Paint, Word, Excel, Powerpoint, Windows, Internet (E-mail, Chatting, Surfing)</td>
<td>Women</td>
</tr>
<tr>
<td>Computer Basics for Senior Citizens</td>
<td>MS Paint, Word, Excel, Powerpoint (elementary level)</td>
<td>Senior Citizens</td>
</tr>
<tr>
<td>Internet for all</td>
<td>Internet (surfing, downloading, E-mail, chatting, social networking, etc.)</td>
<td>All</td>
</tr>
<tr>
<td>Module</td>
<td>Activities</td>
<td>Age Group</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Me and My Computer (Jr.)</td>
<td>Introduction to Computers, Educational prog. (Maths, Science &amp; English), Elementary LOGO, Internet (surfing, downloading), etc.</td>
<td>Std. 2 - 4</td>
</tr>
<tr>
<td>Me and My Computer (Sr.)</td>
<td>Story making, Inside the Computer, Motion picture, Sound, Internet (E-mail, chatting, surfing, downloading), etc.</td>
<td>Std. 5 - 6</td>
</tr>
<tr>
<td><strong>Biology Lab</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learn from Nature</td>
<td>Nature observation – observing plants &amp; animals, Growing plants, Experiments, Reproduction in plants</td>
<td>10 -12 years</td>
</tr>
<tr>
<td>Quality Science Education for Std. 6</td>
<td>Through understanding of all the science concepts and experiments of Std. 6-Science (CBSE/GSEB/ Gujarati and English medium) and evaluation of learning inputs</td>
<td>Std. 6</td>
</tr>
<tr>
<td>Quality Science Education for Std. 7</td>
<td>Through understanding of all the science concepts and experiments of Std. 7-Science (CBSE/GSEB/ Gujarati and English medium) and evaluation of learning inputs</td>
<td>Std. 7</td>
</tr>
<tr>
<td>Knowing Human Body</td>
<td>Study of structure and functions of the human body, supported by experiments, taking care of health &amp; diet</td>
<td>Std. 6 - 8</td>
</tr>
<tr>
<td>Experiments for Std. 6, 7 &amp; 8</td>
<td>Children of Std. 6-8 will be guided to perform a set of science experiments included in their science textbook</td>
<td>Std. 6 - 8</td>
</tr>
<tr>
<td>Nature Trail</td>
<td>An enjoyable outdoor activity to know the natural surroundings and its value</td>
<td>9 - 12 years</td>
</tr>
<tr>
<td>Orientation Programme for Parents</td>
<td>Orientation in spending quality time with your child, Innovative programme to educate parents help their children learn science</td>
<td>Parents of children studying upto Std. 7</td>
</tr>
<tr>
<td>CBSE Projects</td>
<td>Syllabus oriented biology practicals</td>
<td>Std. 10 -12</td>
</tr>
<tr>
<td>Practicals for GSEB / F. Y. B. Sc.</td>
<td>Syllabus oriented biology practicals</td>
<td>Std. 10 - 12  &amp; F. Y. B. Sc.</td>
</tr>
<tr>
<td><strong>Physics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young Physicists</td>
<td>Fun-filled activities &amp; models on the concepts of Physics, Presentations, Quiz, Group discussions, etc.</td>
<td>12 - 14 years</td>
</tr>
<tr>
<td>Physics Projects (Jr.)</td>
<td>Simple &amp; basic projects on conceptual physics</td>
<td>Std. 5 - 10</td>
</tr>
<tr>
<td>Experimental Physics</td>
<td>Experiments in physics based on syllabus</td>
<td>Std. 11 - 12  (CBSE &amp; GSEB)</td>
</tr>
<tr>
<td>Physics Projects (Sr.)</td>
<td>Investigatory projects on conceptual physics</td>
<td>Std. 11 - 12  (CBSE)</td>
</tr>
<tr>
<td><strong>Astronomy Activities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young Astronomers</td>
<td>Hands-on models on conceptual astronomy &amp; astrophysics, presentations, group discussions, popular talks, film shows, educational visits, day and night sky viewing, etc.</td>
<td>13 -16 years</td>
</tr>
<tr>
<td>Module</td>
<td>Activities</td>
<td>Age Group</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Astronomy Club</td>
<td>Working of telescopes, types of telescopes, telescopes and astronomy, night-sky viewing using telescope, conceptual astronomy with experiments &amp; activities</td>
<td>13 - 16 years</td>
</tr>
<tr>
<td><strong>Model Rocketry Lab - Young Rocketeers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module - 1 Single Stage</td>
<td>Fabrication of Single Stage solid propellant model rockets, design your own model rockets, fabrication of launch pads, launching, basic experiments of aerodynamics and rocket science</td>
<td>12 - 14 years</td>
</tr>
<tr>
<td>Module - 2 Double Stage</td>
<td>Fabrication of Double Stage solid propellant model rockets, design your own model rockets, fabrication of launch pads, launching, basic experiments of aerodynamics and rocket science</td>
<td>12 - 14 years</td>
</tr>
<tr>
<td>Module - 4 Water Booster</td>
<td>Fabrication of Water Booster Model Rockets, launching, basic experiments in rocketry</td>
<td>12 - 14 years</td>
</tr>
<tr>
<td>Module - 5 Recovery System</td>
<td>Fabrication of Recovery system solid propellant model rockets, design your own model rockets, fabrication of launch pads, launching, basic experiments of aerodynamics and rocket science</td>
<td>12 - 14 years</td>
</tr>
<tr>
<td><strong>Electronics Lab</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronics World</td>
<td>Know the basics of electronics, learn to assemble components and make your own three gadgets, mounting of components and soldering on PCB</td>
<td>13 - 15 years</td>
</tr>
<tr>
<td>Electronics for You</td>
<td>Know the basics of electronics, learn to assemble components and make your own three gadgets, mounting of components and soldering on PCB</td>
<td>10 -12 years</td>
</tr>
<tr>
<td>Fun with Electronics</td>
<td>Identifying the electronic components &amp; products, lamp, understanding models, preparing torch, operational circuits</td>
<td>8 - 10 years</td>
</tr>
<tr>
<td>Robotics</td>
<td>Make your own mechanical robot</td>
<td>13 - 15 years</td>
</tr>
<tr>
<td>Electronics Club</td>
<td>Basics of electronics, Electronic Principles &amp; theorems related to school curriculum with experiments &amp; making instruments on those, understanding circuit diagrams &amp; symbols, knowing functioning of various electrical components, semiconductors &amp; its devices, PCB layout, designing, soldering, making your own projects</td>
<td>12 - 15 years</td>
</tr>
<tr>
<td><strong>Chemistry</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chem for kids</td>
<td>Writing with fire &amp; water, experiments of air &amp; water, Cold welcome, Fire without matchstick, Burning a paper, Battlefield, Volcano, Invisible message, Colour separator, Chromatography, Acid &amp; base, Make instant ice, Soap mountain, Magic bottle, Chemical filtration</td>
<td>Std. 1- 4</td>
</tr>
<tr>
<td>Module</td>
<td>Activities</td>
<td>Age Group</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Chem Club - Jr.</td>
<td>Curricular experiments of std. 5 -7, Analysis of food articles, Element-mixture-compounds, Reaction of metals, Neutralization by titration, Separate the substances, Chemistry investigatory projects</td>
<td>Std. 5 - 7</td>
</tr>
<tr>
<td>Chem Club - Sr.</td>
<td>Introduction to chemistry lab, How to use equipments &amp; apparatus, Curricular experiments of Std. 8-10, Fun with Chemistry, educational Visit, Investigatory projects</td>
<td>Std. 8 -10</td>
</tr>
<tr>
<td>Annual Chemistry Practical</td>
<td>GSEB/CBSE/ICSE Board syllabus oriented practicals</td>
<td>Std. 11 - 12</td>
</tr>
<tr>
<td>Chemistry Investigatory Projects</td>
<td>Investigatory projects</td>
<td>Std. 6 - 12</td>
</tr>
<tr>
<td>Experimental Chemistry - Revision of Practicals</td>
<td>GSEB/CBSE/ICSE Board syllabus oriented practicals</td>
<td>Std. 11 - 12</td>
</tr>
</tbody>
</table>

**General Science Programme**

| Saturday Science Forum       | Preparing microscopic slides, Physics experiments, Science craft, Model making, Making Maths simple, Meet the Scientist, Fun with Chemistry, Educational visit to industry/institution, Astronomy, Weather and Climate, Rocketry for beginners, Nature Trip, Outdoor science activities, Competitions, Computer basics, Science film show, improving reading and writing skills, making electronic gadget, introduction of TLM and kits | Std. 5 - 7  |

**Science Hobby Workshop**

| Do it Yourself - I            | Windmill, Windwheel, Flying fish, Running wheel, Spacecraft, Whirling fan, Acrobatic casule, Clap in the air, Parrot in the cage, Heat kit, Origami, Simple experiments of science | 6 - 9 years |
| Do it Yourself - II           | Introduction of tools and techniques, Measurement and scale, Weather vane, Colour filter, Wave motion, rainbow colours, Angles between mirrors, Barometer | 9+ years    |
| Do it Yourself - III          | Introduction of tools & techniques, Measurement & scale, Periscope, Lens camera, Revolutionary motor, Giant yo-yo, Kaleidoscope, Stroboscope, Jig-saw puzzle, Magic Coin box | 11+ years   |

6. **Annual Events**

**World Space Week Celebration**

The World Space Week was celebrated at the Centre during 04-10 October 2009. This event was supported by Indian Space Research Organization (ISRO). Competitions, events, exhibitions and talks were the prime attractions of the event. Competitions like model-making on the themes 'Space Colony, Future Spaceships and Future Telescopes', Space Quiz, Science Fiction Story Writing; Exhibitions; talk on 'Careers in Space Sciences', film shows; night sky viewing in 'Astronight' programme, Astro Workshop for students of Std. 7-9 and live phone-in programme.
on Astronomy (with Gyan Vani), were organized as a part of this event. Around 1030 people participated in this event.

Science is fun
The ‘Science is fun’ is a five-day event organized to involve students and the community in science through fun-filled activities. This event was sponsored by Gujarat Gas Co. Ltd. and was organized at Surat and Ankleshwar.

This event was organized at Surat during 21-24 December 2009. The venue for the event was P. P. Savani International School. 100 schools and 7045 visitors including teachers, parents and lay public visited the event. This event at Ankleshwar was organized at Shree Gattu Vidyalaya during 8-10 February 2010. 7025 visitors including teachers, parents and lay public visited the event. The event included a number of competitions, exhibitions and activity stalls. Competitions like Science Fair, Science Quiz, Science Art, Science Debate, Science Skit, Science Fiction, Science Poster Presentation, were organized. Besides these, competitions like Slogan Writing and Question of the Hour and open events like Science Show, Science Talk and workshops like Model Rocketry Workshop, Aeronautics workshop, Do it Yourself Hobby workshop, Kite-making workshop and Kite show were also organized. Best entries in the various competitions were awarded prizes and certificates. The selected entries in Science Fair and Art were displayed as a part of science and art exhibition. Exhibition on Mathematics and Computer were popular and witnessed a good response.

National Olympiad Test
VASCC coordinated the National Standard Examinations in Physics, Chemistry, Biology and Astronomy, conducted by Indian Association of Physics Teachers (IAPT) on 22 November 2009. In all, 120 students appeared for the exams.
To motivate and empower Science Educators or those associated with the field of science education, a number of capacity building initiatives are undertaken by the Centre. This exercise serves to orient the participants towards hands-on approaches in teaching. The Centre organizes capacity building workshops and interactive sessions for school teachers & science educators. These workshops also help to spread innovative methods in science teaching. Efforts are made to identify difficulties faced by the educators & develop antidotes. The material developed keeping in mind their difficulties, can be then utilized in classroom teaching. These initiatives result in dissemination of information, creating awareness and interest in science among one and all.

The capacity building was also done through one-to-one interaction with teachers who visited the Centre. Interaction with teachers/educators during the training workshops was utilized to promote the Centre's methodologies. The following workshops and lectures were conducted:

- Projective geometry lecture series was conducted throughout the year by Prof. A. R. Rao. This series was popular among school and college maths teachers.

- Mr. Tanmay Vyas delivered a talk on 'Exploring Solar System' at the Centre on 01 May 2009.


- A talk was delivered by Prof. J. N. Desai on 'Solar Eclipse' at the Centre on 19 July 2009.

- Prof. S. P. Deshpande delivered a talk on 'Kerala School of Mathematics' at the Centre on 22 August 2009.

- A talk on 'Mathematical Reasoning' was delivered by Ms. Smruti Buch at the in-service course for PGT-Maths of Kendriya Vidyalaya Sangathan at Kendriya Vidyalaya, Ahmedabad Cantonment on 08 June 2009.

- A talk on 'Sets, Relations, Functions' and 'Setting up a Maths lab' was delivered by Ms. Hema Vasavada at the in-service course for PGT-Maths of KV Sangathan at Kendriya Vidyalaya, Ahmedabad Cant. on 09 June 2009.

- An orientation programme was organized for Science Communicators of Science Express at the Centre during 07 -13 October 2009.

- Science talks were delivered by Dr. Dilip Ahalpara, IPR on 22 December 2009; Dr. Hari Om Vats, PRL on 23 December 2009 and Dr. Darshana Thakkar on 24 December 2009.

- Science Talks were delivered by Mr. Kileen Mahajan, Narmada College of Science & Commerce, Bharuch on 08 & 10 February 2010.

- A seminar on 'Preparing for higher studies in the US' was conducted by Mr. Parag Raval, Founder & Managing Director of ConsulTeam, LLC, California on 21 April 2010 at the Centre.
Mathematics Workshops

The focus of Mathematics workshops is on orienting the teachers and students towards 'learning by doing' approach. In these workshops, participants were provided training in fabricating their own mathematical models, teaching aids and puzzles from simple material. They were also oriented on setting up a maths lab facility using this material in their respective schools.

- A 3-days mathematics workshop on 'Non-formal mathematics and model making' was conducted by the Centre's team for Primary School Teachers during 14-16 April 2009 at Ameya World School, Vishakhapatnam, A. P. 55 teachers participated in this training.

- A 3-days mathematics workshop on 'Non-formal mathematics and model making' was conducted by the Centre's team for Std. 1-7 students during 17-18 April 2009 at Ameya World School, Vishakhapatnam, A. P.

- Mathematics Workshops were conducted by the Centre's team at State Teachers' Training Institute (STTI), Gandhinagar for secondary school teachers, as follows:
  - During 11-13 June 2009, for teachers from Dahod district, Gujarat, in which 45 teachers participated.
  - During 03-05 July 2009, for teachers from Dhendhuki (Jasdan), Gujarat, in which 45 teachers participated.
  - During 06-08 July 2009, for teachers from Vadodara district, Gujarat, in which 35 government school teachers participated.
  - During 27-29 August 2009, for teachers from Patan district, Gujarat; 30 teachers participated.
  - During 17-19 September 2009, for 30 teachers from Rajkot district, Gujarat.
  - During 29 September-01 October 2009, for 30 teachers from Panchmahal district, Gujarat.
  - During 11-13 November 2009, for 30 teachers from Amreli district, Gujarat.
  - During 16-18 December 2009, for 30 teachers from Ahmedabad (rural) district, Gujarat.

- A mathematics workshop was conducted during 06-08 October 2009 at GNFC, Bharuch for 40 secondary school teachers.

- A maths workshop was conducted during 09-10 October 2009 at GNFC, Bharuch for 120 primary school teachers from Bharuch, Gujarat.

- A TLM demonstration workshop was conducted at Sheth C N Vidyalaya, Ahmedabad during 21-22 November 2009 in which 100 PTC students and 12 teachers participated.

- A TLM Orientation workshop was organized as a part of 3rd National Conference on Technology in Math Education-2009' hosted by the Mathematics Department, IIT Bombay during 04-07 December 2009.
The Centre has been continuously developing educational material, exhibits and teaching aids for science and mathematics. The Outreach Programme has been developed to mainstream this material. Several workshops and exhibitions are conducted at different places including rural areas, which benefit teachers, students and the community. These activities are mentioned as follows:

**Education Programme in School**
The Centre continued its interventions at Bopal Primary School, Ahmedabad to enhance the quality of science and mathematics education and increase the students’ interest in science. A team of resource persons visited the school regularly and conducted activity-based sessions in physics, chemistry, biology and mathematics for students of Std. 5 -7. This programme was supported by Manorama Sheth Education Fund.

**‘Joy of Science’ Outreach Programme**
An Outreach programme titled ‘Joy of Science’ was conducted at different schools in Gujarat during July-August 2009. The programme comprised hands-on activities through Centre’s innovative TLM and Astronomy Programme. Demonstrations, presentations, movies, activities, awareness on solar eclipse were interwoven in this programme to make it appealing to students. Around 1655 students & 99 teachers participated in this programme. The schools where this programme was conducted include:

1. F.D. Higher Secondary School, Ahmedabad
2. Rachana School, Ahmedabad
3. Satyamev Jayate School, Ahmedabad
4. Shree R. N. Naik High School, Udhna
5. Shree H. M. B. Sardar High School, Surat
7. Sun Flower High School, Surat
8. Karnavati Public School, Ahmedabad
9. Maharaja Agrasen Vidyalaya, Ahmedabad
10. Memnagar Sarvajanik Vidyalaya, Ahmedabad
11. S. G. Patel Gomtipur High School, Ahmedabad

An Outreach Programme was organized by Centre's team members at Reading Tree Bookshop during June 2009 for the visitors to the bookshop. Activities like puzzles and ‘Do it yourself’ were conducted with children.

**Space Education for Schools and Communities**
This project is supported by Department of Space, ISRO and involves establishing Model Rocketry Laboratory at VASCSC and Space Education Cells in different regions of Gujarat, which would then...
promote space science in their area. The following activities were conducted as a part of this project:

- Two Space Education Cells were created, at Surat and Bharuch, and the space education activities in schools of these areas were initiated.

- An Orientation Programme was organized for the team of Space Education Cell - Bharuch in the month of January 2010.

- A project work on 'Micro controller based Thrust Measuring Device for Model Rockets' was carried out with involvement of students.

- The World Space Week celebrations were organized as a part of this project during 04-10 October 2009 at the Centre. The celebrations included competitions, exhibitions, student-scientist meet, film shows, Astronight and live radio phone-in programme. Around 1030 visitors were recorded in this programme.

- Two Model Rocketry workshops were conducted at Bhuj in August 2009; in two schools of Bharuch; at Shri P. P. Savani International School, Surat on 23 December 2009 and Shree Gattu Vidyalaya, Ankleshwar on 09 February 2010. A total of 600 students participated in these workshops and designed and launched their own model rockets.

- Total Solar Eclipse Campaign was organized during 19-22 July 2009. This campaign included safe watching of eclipse and watching live telecast on internet. Some competitions like quiz, poster competition, Art on Computer, and Question of the Hour. An exhibition, posters on solar eclipse and lectures were arranged for visitors. This campaign recorded 1550 visitors. As a part of this campaign, an awareness programme was conducted in seven schools of Ahmedabad and four schools of Surat.

- Partial Solar Eclipse viewing programme was arranged on 15 January 2010 at the Centre. A team from VASCSC traveled to Tamil Nadu to observe the Annular Solar Eclipse.

**Mathematics Exhibitions**

Mathematics exhibitions were organized at the following places to create an interest among people in mathematics:

- Mathematics Exhibition during the 3rd National Conference on 'Technology in Math Education - 2009' hosted by the Mathematics Department, IIT Bombay during 4-7 December 2009.

• Mathematics Exhibition during 'Science is Fun' event at Shree Gattu Vidyalaya, Ankleshwar during 08-10 February 2010.

Science Shop
The Centre works extensively on developing new and innovative Teaching Learning Material. This material includes publications, kits and models. The Science Shop is a facility which makes this material available to the community.

A brochure containing the list of material available at Science Shop was printed and distributed. The Science Shop set up stalls at different locations for wider reach, which is given as follows:


• At VIKSAT, Ahmedabad during the state-level orientation workshop under National Environmental Awareness Campaign (NEAC) on 19 January 2010.

• At Shree Gattu Vidyalaya, Ankleshwar during 08-10 February 2010.

• At Tagore Hall, Ahmedabad on 26 Feb 2010.

• At Ahmedabad City Mall on 27 February 2010.

Smt. Mrinalini Sarabhai at the Centre on occasion of Dr. Vikram Sarabhai’s birth anniversary on 12 Aug 2009

Shri Sam Pitroda addressing the VASCSC team at the Centre on 02 Sept 2009
Core Programmes form the heart of Centre’s activities. In addition to the core programmes, other projects and programmes were also conducted, the details of which are as follows:

Upgradation of facilities at VASCSC
The Centre upgraded the existing laboratories of Physics, Chemistry, Biology, Electronics, Mathematics, Computers; the Science Playground and Library to cater to its growing needs of the students, teachers, educationists interested in science and the community at large. The upgradation of the existing facilities was done from the grant that it received from the Juniper Networks Foundation Fund. Modernizing VASCSC lab facilities included repair and maintenance of labs and lab furniture, purchase of new equipments for the labs and repair and maintenance of science playground.

Supporting GUJCOST Science Clubs
The Centre was entrusted to function as the ‘State -level Resource Centre’ for the Science Clubs scheme by the Gujarat Council on Science and Technology (GUJCOST). As part of this, VASCSC conducted a two day orientation workshop on 10-11 November 2009 for the Key Resource Persons on planning and implementation of the Science Clubs and their activities in the schools of Gujarat. 47 participants including school teachers and managers from 21 districts of Gujarat attended the workshop.

VASCSC, as the State level Resource Centre, developed and produced publications in Gujarati which include GUJCOST Science Club Poster, Guidelines for setting up and running a Science Club, Science Club Diary to record the activities conducted, in order to help the schools in setting up Science Clubs and creating science awareness.

Radio Programme
(a) Phone-in and Science Time Programmes
Starting from July 2009, VASCSC partnered with Gyan Vani educational radio channel (105.6 FM) for two radio programmes:

(1) Live Science Phone-in Programme: This programme is broadcast on the second and fourth Tuesday of every month during 9:00-10:00 am and repeated on same day during 9:00-10:00 pm. In this programme, experts discuss a science topic and respond to phone-in queries. 18 such programmes were aired during July 2009 - March 2010.

(2) Science Time: This is a four minute science capsule, the content of which was prepared by
VASCSC and aired every Thursday at 7:00 am and 7:00 pm. 48 such capsules were aired starting from July 2009.

(b) Programme on Astronomy
A 54-episode radio series titled Nirakh ne gagan ma... was developed with support from Vigyan Prasar and All India Radio. The programme was based on drama and discussion, included astronomical facts, tips on sky-watching, and a quiz. It was broadcast from Akashvani’s Ahmedabad and Baroda stations on every Monday during 9:30 - 10:00 pm.

Bal Urja Rakshak Dal (BURD) Programme
This programme, sponsored by Gujarat Energy Development Agency (GEDA), was conducted all over Gujarat to spread the message of energy conservation. VASCSC was entrusted with the responsibility of implementing it in 80 schools of Ahmedabad (urban) district. The activities conducted included national level drawing competition, teachers' training, celebration of National Energy Conservation Day, educational trip to place of sustainable architectural importance, documentation of the visit in form of a multimedia presentation or a report, preparing working model and 'best out of waste' project. Around 2560 students and teachers from these schools participated in this programme.

Advanced B.Sc. (Physics) Summer Programme
This is an enhanced Physics programme jointly conducted by VASCSC, Gujarat Science Academy (GSA) and Gujarat Science City, to motivate B.Sc. Physics students to pursue career in research. This programme is aimed to provide them a firm grounding in the areas of mechanics, electromagnetism, quantum mechanics, mathematical physics, etc. This programme involved assignments and problem solving, guidance for a career in Physics, visit to research institutes and talks by eminent scientists. This was a residential programme, organized during 11-30 May 2009. 21 students participated in it.

International Year of Astronomy (IYA-2009)
The year 2009 being declared the International Year of Astronomy, activities were conducted to commemorate it, which are given as follows:

Interactive Sky Programme
An interactive sky programme comprising presentation, night sky watching, etc. was conducted in schools and institutions around the country by the Science Express team members. This programme was also conducted in seven schools of Ahmedabad and four schools of Surat in which 1655 students, 99 teachers participated.

Radio Programme
A 54-episode radio series in Gujarati titled Nirakh ne gagan ma.. was developed in collaboration with Vigyan Prasar and All India Radio. This programme was available in Ahmedabad and Baroda.

Additionally, events like World Space Week, Total Solar Eclipse Campaign and Partial Solar Eclipse Campaign were organized at the Centre to popularize Astronomy.
**Educational Trips**

Educational trips to different institutions and places were organized for students to provide them an exposure to latest trends in Science. The trips organized are given as follows:

- A trip was organized to Kalp Systems on 20 March 2009 for 12 students of Me & My Computer programme.

- A trip was organized to Mother Dairy, Gandhinagar on 04 April, 01 May & 08 May 2009 for participants of Chemistry Hands-on programme.

- A trip was organized to Public Health Office, NHL Medical College, Ahmedabad on 08 May & 15 May 2009 for students of Summer Science Forum programme.

- A trip was organized to Gujarat Science City for 35 participants of Summer Science programme in May 2009.

- A trip was organized to Gyan Vani Radio recording studio, Ahmedabad on 20 May 2009 for 20 students of Summer Science Forum programme.

- Participants of Summer Science Forum Programme visited and participated in World Environment Day-2009 celebrations at CEE, Ahmedabad on 05 June 2009.

- A trip was organized to Reading Tree Book Shop, Ahmedabad on 28 June 2009 for 20 students of Summer Science Forum programme.

- A trip was organized to Life Sciences Museum, Zoology Dept., Gujarat University, Ahmedabad on 08 October 2009 for students of ‘Knowing Human Body’ programme.

**Career Counselling**

A programme for counselling high school students on 'Career Opportunities in Science' was conducted at the Centre from 14 - 21 June 2009, which received a good response from students.

**Workshop for Students**

A Science, Maths and Computer workshop was organized at the Centre for 50 underprivileged students of Std. 2-6 during 21-31 October 2009. This workshop was supported by Pandit Deen Dayal Petroleum University, Gandhinagar.
Science Express (Phase - II)

Vikram A Sarabhai Community Science Centre Ahmedabad (VASCSC) has been entrusted by Department of Science & Technology (DST), Govt. of India, with the task of managing the prestigious Indo-German project ‘Science Express’ around the country. This exhibition was developed by the Max Planck Society, Germany and mounted by NCSTC, DST on a special train provided by the Indian Railways.

This exhibition train has 16-coaches, out of which 12 are exhibition coaches. The exhibition, with more than 300 large-format visual images, over 150 video clips and multimedia exhibits, deals extensively with cutting-edge research in science and technology. Though the exhibition is open for all, it primarily targets high school and college students. It attempts to develop scientific temper among them and encourage them to pursue careers in science. It strives to take modern research out of the lab and reveal how relevant science is to everyday life.

The Phase - II included a number of additions from VASCSC like redesigning the coach ‘Frontiers of Science’. New exhibits from the Centre and other institutions were included in this phase. The prime attraction was VASCSC’s Joy of Science (JOS) lab where students could perform hands-on activities and experiments in Biology, Physics, Chemistry, Electronics and Mathematics.

The exhibition concluded at Delhi Safdarjung station on 30 May 2009, and a valediction ceremony was organized. Mr. Prithviraj Chavan, Honourable Minister for Science & Technology, Govt. of India was the Chief Guest at the function. The Guests of Honour were Dr. T. Ramasami, Secretary, DST; Er. Anuj Sinha, Scientist ‘G’ & Head, DST; Dr. M. K. Bhan, Director General, Department of Scientific & Industrial Research; Dr. S. Brahmacari, Secretary, Department of Biotechnology and Mr. B. D. Garg, DRM. Mr. Dilip Surkar, Executive Director, VASCSC and Mr. Chander Mohan, Director, DST conducted the valediction function.
Schedule and details of Science Express (Phase - II) during the year 2009:

<table>
<thead>
<tr>
<th>Date</th>
<th>Station /City</th>
<th>State</th>
<th>No. of Visitors</th>
<th>JOS Participants</th>
</tr>
</thead>
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<tr>
<td>01-04 April 2009</td>
<td>Jabalpur (Madanmahal)</td>
<td>Madhya Pradesh</td>
<td>20804</td>
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<td>Uttar Pradesh</td>
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<tr>
<td>08-09 April 2009</td>
<td>Garhwa Road</td>
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<td>12965</td>
<td>232</td>
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<tr>
<td>11-14 April 2009</td>
<td>Sealdah</td>
<td>West Bengal</td>
<td>13520</td>
<td>516</td>
</tr>
<tr>
<td>15-17 April 2009</td>
<td>Malda Town</td>
<td>West Bengal</td>
<td>7421</td>
<td>480</td>
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<tr>
<td>18-20 April 2009</td>
<td>New Coochbehar</td>
<td>West Bengal</td>
<td>12622</td>
<td>752</td>
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<tr>
<td>21-23 April 2009</td>
<td>Chaparmukh</td>
<td>Assam</td>
<td>5082</td>
<td>337</td>
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<tr>
<td>24-27 April 2009</td>
<td>New Tinsukia</td>
<td>Assam</td>
<td>9550</td>
<td>423</td>
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<tr>
<td>29 April - 01 May 2009</td>
<td>Kamakhya</td>
<td>Assam</td>
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<tr>
<td>02-03 May 2009</td>
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<td>04-07 May 2009</td>
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<td>14-17 May 2009</td>
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<td>Uttar Pradesh</td>
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<td>18-21 May 2009</td>
<td>Rae Bareli</td>
<td>Uttar Pradesh</td>
<td>19630</td>
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<tr>
<td>22-24 May 2009</td>
<td>Moradabad</td>
<td>Uttar Pradesh</td>
<td>9108</td>
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<tr>
<td>25-27 May 2009</td>
<td>Roorkee</td>
<td>Uttarakhand</td>
<td>17456</td>
<td>406</td>
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<tr>
<td>28-30 May 2009</td>
<td>Delhi Safdarjung</td>
<td>NCR</td>
<td>1519</td>
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</tr>
</tbody>
</table>

**Total Visitors (01 April - 30 May 2009)** 236335 7121

**Science Express (Phase - III)**

The third phase of the Science Express was launched from Gandhinagar, Gujarat on 02 October 2009, coinciding with the birth anniversary of Mahatma Gandhi.

The inauguration ceremony was organized at Gandhinagar Capital Railway Station. The launch function was inaugurated by the Chief Guest, Mr. S. S. Khurana, Chairman, Railway Board. Other dignitaries who graced the occasion included Mr. Kartikeya V. Sarabhai; Chairman, Standing Committee, VASCSC; Mr. R. N. Verma, General Manager, Western Railway; Dr. R. R. Navalgund, Director, SAC-ISRO; Mr. Rajkumar, Secretary, Science & Technology, GoG; Mr. Stuart Davis, CEO, HSBC; Mr. Chander Mohan, Director, NCSTC and Mr. Dilip Surkar, Executive Director, VASCSC.

This phase of Science Express was scheduled from 02 October 2009 - 27 April 2010 during which it would remain open at 56 halts, travelling over 18000 km, over a period of 208 days. More details on [www.scienceexpress.in](http://www.scienceexpress.in).
## Schedule and details of Science Express (Phase - III) during the year 2009-10:

<table>
<thead>
<tr>
<th>Date</th>
<th>Station /City</th>
<th>State</th>
<th>No. of Visitors</th>
<th>JOS Participants</th>
</tr>
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<tbody>
<tr>
<td>02-06 &amp; 14-15 Oct 2009</td>
<td>Gandhinagar</td>
<td>Gujarat</td>
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<td>16 &amp; 18 - 21 Oct 2009</td>
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<td>22 - 25 Oct 2009</td>
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<td>09 - 12 Nov 2009</td>
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<td>Andhra Pradesh</td>
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<tr>
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<td>01 - 03 Feb 2010</td>
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<td>Orissa</td>
<td>13117</td>
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<td>Date</td>
<td>Station /City</td>
<td>State</td>
<td>No. of Visitors</td>
<td>JOS Participants</td>
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<tr>
<td>-----------------</td>
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<td>---------------</td>
<td>----------------</td>
<td>-----------------</td>
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<td>28 Feb 2010</td>
<td>New Jalpaiguri</td>
<td>West Bengal</td>
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<td>02 - 04 Mar 2010</td>
<td>Darbhanga</td>
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<td>Bihar</td>
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<td>Jammu &amp; Kashmir</td>
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</table>

(Total Visitors (02 October 2009 - 31 March 2010) 1511767 39189)
The publications brought out by the Centre during 2009-10 are as follows:

**Vigyan Drishti**
Vigyan Drishti is a bimonthly science wall magazine in Gujarati. It is aimed at students of Std. 5 and above. Six issues were brought out during this year and included interesting articles and activities.

**GUJCOST Science Club Diary**
A diary was specially developed for use in GUJCOST science clubs, containing interesting scientific information and activities useful for these clubs.

**Periodic Table**
The Periodic Table was brought out in the form of a poster. The poster also included facts and information related to the periodic table.

**Buddhi Kaso**
A Gujarati version of the popular publication 'Brain Sharpeners' was brought out for wider circulation among Gujarati readers. This publication is a collection of 116 mathematical brain teasers with their hints and solutions.

**Posters on Astronomy**
A set of four posters was developed to celebrate the International Year of Astronomy - 2009 and create an interest in Astronomy. The themes of these posters were Telescope, Seven Wonders of the Universe, Eclipses and Our Celestial Sphere. This initiative was supported by NCSTC, DST, GoI.

Besides the above mentioned new publications, a few popular Gujarati publications were reprinted which include *Aakash bhuru sha maate, Paryavaran ane maaru jivan, Kaansa no Rankar, Urja- ek parichay, Gammat saathe vignan* and *Drashtibhram-ek anokho sangrah*. Some of the Centre’s publications were procured by UNICEF for dissemination in schools across Gujarat.

**VASCSC Library**
The Centre’s library houses a collection of science and mathematics reference books. These books include books for children as well as advanced reference material for high school and college students who have been using this facility regularly. 2650 people utilized the VASCSC library facility during 2009-10.
Networking and Participation

VASCSC team members participated in the following programmes:

- Ms. Surabhi Bhatt attended the Resource Committee meeting at Gujarat Science City for selection of reference books for the E-library on 13 May 2009.

- Mr. Amol Kate, Ms. Chaitalee Pravin and Mr. Chetan Patil participated in the conference 'Indian Astronomy - Ancient and Modern' organized by Indian Planetary Society during 28 - 30 June 2009 at Town Hall, Ahmedabad.

- Ms. Chaitalee Pravin and Mr. Sudhir Sharma attended a review workshop organized by Vigyan Prasar for radio series on Astronomy at New Delhi on 06 July 2009.

- The Centre's team interacted with the eminent scientist, Prof. Yashpal at CEE on 19 August 2009. Mr. Dilip Surkar and Ms. Megha Saklani attended the lecture on 'Inner Processes of developing an advice to radically change the culture and management of higher education' by Prof. Yashpal at AMA on 19 August 2009.

- The Centre's staff members attended a lecture on 'Science Hands-on approaches' delivered by Mr. Kartikeya V. Sarabhai at the Centre on occasion of Teachers Day on 05 Sept 2009.

- Ms. Ashika Bhatt attended a seminar on 'Standards and labelling' organized by Bureau of Energy Efficiency at Ahmedabad on 27 October 2009.

- Ms. Megha Saklani and Mr. Dipak Shrimani attended the state-level orientation workshop under National Environmental Awareness Campaign (NEAC) organized by VIKSAT on 19 January 2010. The theme of the workshop was 'Climate Change.'

- Ms. Megha Saklani attended the workshop titled 'Where do I find the science in fiction?' organized by British Council Library at Darpana Academy of Performing Arts, Ahmedabad on 24 January 2010.

- Ms. Foram Mehta and Ms. Megha Saklani attended the Gujarat Science Congress organized at Gujarat University on 21 March 2010.

- Mr. Amol Kate and Ms. Megha Saklani were selected for the prestigious Rajat Jayanti Vigyan Sancharak Fellowship, awarded by National Council of Science & Technology Communication (NCSTC), DST, Govt. of India.

VASCSC has been networking with several institutions and organizations. The following is a list of some of the collaborating institutions:

- All India Radio (AIR), Ahmedabad
- British Council Library, Ahmedabad
- Cairn Energy India (CSR Division)
I. Major Funding and Project Partners

We are thankful to the following agencies who have been our major funding and project partners:

- Department of Education, Government of Gujarat
- Department of Science & Technology, NCSTC, Government of India
- Gujarat Council on Science and Technology (GUJCOST)
- Gujarat Energy Development Agency (GEDA)
- Gujarat Gas Company Ltd.
- HSBC, Mumbai
- Indian Space Research Organization (ISRO)
- Juniper Networks Foundation Fund, USA
- Vigyan Prasar, Noida

Our Bankers

- Bank of India, Navrangpura, Ahmedabad
- Canara Bank, Vastrapur, Ahmedabad
Kids are the medium: energy message delivered home

Schoolchildren take out rally to highlight how to save energy

DNA Correspondent

Around 1,500 students from over 60 schools in the city participated in a rally organised by Vikram A Sarabhai Community Science Centre (VASCSC) on the occasion of National Energy Conservation Day on Monday. The rally was held as part of a programme aimed at spreading the message of conservation of energy.

After the students gathered at VASCSC at 8am, they were motivated with inspiring speeches by VASCSC director Dilip S Inamdar and Centre for Environment Education co-ordinator Parthsh Patel.

At VASCSC, the rally was flagged off by S Inamdar. The rally, inspired by Gujarat University, was paraded against a six-km route.

"There were two rallies held in the city. The first rally was held in Gujarat University area, passing by St. Xavier’s College. The rally covered around a six-km route," said Dilip Patel.

ed slogans like “Urja Bachao, Vatva Bachao” in the rally. It was a colourful scene for all those who watched it. The students not only motivated the passers-by with their enthusiasm, but also carried the message home.

The students resolved not only to reduce wastage and save energy but also to spread this message in their neighbourhood.

Simultaneously, a drawing competition on energy conservation theme was also conducted for students of stan-
Chairman
Shri Sam Pitroda
301, Trinity Lane Oakbrook, IL 60523, USA

Central Government Nominees
The Secretary
School Education and Literacy
Department of School Education & Literacy
MHRD, Government of India
Shastri Bhavan, New Delhi 110 001

The Financial Advisor
Department of Education
Integrated Finance Division
MHRD, Government of India
Shastri Bhavan, New Delhi 110 001

State Government Nominee
The Principal Secretary
Department of Education
Government of Gujarat
Block no. 5, 7th Floor
New Sachivalaya, Gandhinagar 382 010

Members
Shri B. S. Bhatia
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