



Annual Report
2015-16

The Joy of Science



50 years of excellence in Science education



**VIKRAM A SARABHAI
COMMUNITY SCIENCE CENTRE**

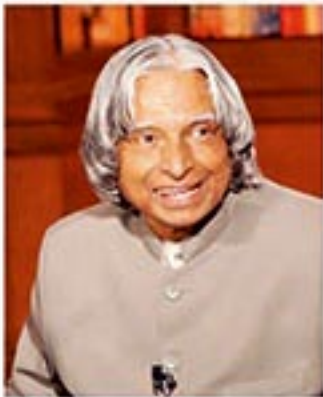
TRIBUTE



Smt. Mrinalini Sarabhai (Amma)

11 May 1918 - 21 Jan 2016

VASCSC's mentor - Amma, passed away on 21 January 2016. She was deeply involved in the Centre's growth right from its inception. She was a member of the VASCSC Board of Governors. A well-known danseuse whose contribution to dance is unparalleled, she was equally concerned about the role of science and education in society. Her guidance propelled the Centre's activities to greater heights and she was a true inspiration for VASCSC.



Dr. A. P. J. Abdul Kalam

15 Oct 1931 - 27 July 2015

India lost one of its greatest scientists - Dr. Kalam on 27 July 2015. Dr. Kalam was the Chairman of VASCSC Board of Governors from 2000 to 2003 before embarking on his position as the Hon'ble President of India. His invaluable guidance charted out the Centre's path to 'ignite' the minds of millions of Indians with the spark of Science.

"Educationists should build the capacities of the spirit of inquiry, creativity, entrepreneurial and moral leadership among students and become their role model."

The Joy of Science

Innovative Programmes and Material for Science Education

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2015 - 16



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Chairman's Message



Vikram A Sarabhai Community Science Centre's (VASCSC) is successfully fulfilling its mandate of taking science to the community since the past 49 years. It has evolved at the forefront of Science education due to the vision of its founder and well-wishers, hard work of the team and participation of one and all. This year, we lost two such visionaries who have shaped the evolution of the Centre and strengthened it with their guidance - Dr. A. P. J. Abdul Kalam and Smt. Mrinalini Sarabhai (Ammma). I pay homage to these great personalities, who were role models for millions of Indians. Their legacy will live on through their work and VASCSC.

VASCSC continued its innovative programmes for improving quality of science education, its popularization and building scientific temper, with a great zeal and passion in 2015-16. It reached out to different parts of the country through its programmes and teaching learning material. I am happy that this Annual Report presented here showcases efforts made by the Centre to promote innovation in Science education, to reach out and to scale up, which have been the top priorities for the Centre to leverage its position globally as a 21st century knowledge institution.

The Centre has been entrusted by the Dept. of Science & Technology, Govt. with the task of managing the Science Express exhibition train across India, since its inception in 2007. VASCSC has handled this responsibility with utmost diligence and is successfully coordinating the eighth phase of the Science Express as Climate Action Special (SECAS). The SECAS is a novel way of creating mass awareness about one of the biggest global challenge of today's time. India's long tradition of sustainable lifestyles and innovation in addition to technology can give rise to effective strategies to face this challenge. I am happy that the SECAS is also showcasing India's innovations in Science & Technology. This will go a long way in building a culture of innovation in the country. The Centre has played a major role in reaching out to over 15 million people across India through this innovative and massive outreach programme Science Express.

It is exciting to know that an Innovation Hub is being set up at the Centre with support from NCSM, Govt. It has been a long cherished dream to evolve the centre as a go-to place for exploring innovative ideas. The components of the Innovation Hub like Discovery Hall, Innovation Lab, Hall of Fame and Design Studio will provide an opportunity for young students to tinker, to create and to explore and develop themselves into 'innovators' for life. Innovative thinking only will help us move out from the past century's mindsets and process to address 21st century needs.

The Centre is offering variety of hands-on programmes and material for teachers, students and the community. These are popular as they address the need for innovative teaching and learning tools and strategies in Science and Mathematics education. Programmes are conducted for children from underprivileged and remote locations which enable them to access quality Science education. Capacity building of teachers is also a large thrust area with participation of teachers from various places, school level and type, in the training workshops. The activities have nudged youngsters to pursue higher education and careers in Science. On the other hand, through Science Express a new cadre of Science Communicators has been created.

I am happy that the Centre has broadened its network and is working with several project partners, both from private and government sectors. The collaborations have helped the Centre to mobilize resources to undertake more innovative projects and reach out to more people. The Centre's presence on social media has more people connected to it now. This time is right to digitalize its content and make it available online.

We at VASCSC invite young people and local leaders from all communities all over the country to take special interest in Math and Science and learn to explore new frontiers through visiting VASCSC and other Science centers. Science and scientific temper are important to national integration and nation building. Our mission is to encourage everyone to enhance understanding and appreciation of Science and technology for day to day problem solving. I extend my congratulations and best wishes to the Director and team for putting in their best efforts for furthering the institution's mandate. I would like to thank the board members, project partners, well-wishers, students and teachers for their consistent support. I look forward to the Centre achieving greater success in the coming years.

Sam Pitroda
Chairman, Board of Governors, VASCSC

From the Director's Desk



As the Vikram A Sarabhai Community Science Centre (VASCSC) enters into its fiftieth year, it is a time to look back and remember all the people who have contributed to making this glorious journey possible. We are deeply saddened by the loss of Centre's two such guiding lights - Smt. Mrinalini Sarabhai (Amma) and Dr. A. P. J. Abdul Kalam who have, with their vision and dedication, inspired us. Their names will remain etched in our memories forever.

We are happy to present VASCSC's Annual Report for the year 2015-16. Several new and exciting developments have been presented in the Report. We are glad that our efforts for popularizing and improving the quality of Science education have been well-received. VASCSC has been encouraging and bringing out innovations in Science and Mathematics education. The idea to develop the Centre further as a hub for innovations, has been around since long. This idea received an impetus through the 'Innovation Hub' project, supported by NCSM, Govt. of India. The Centre, as Innovation Hub, will provide conducive environment to foster creativity and spirit of inquiry in children and developing them as innovators for life. Under this project, the work related to planning, redeveloping the existing facilities and student activities began. Also, VASCSC has been identified by MHRD, GoI as one of the national level nodal institutions for implementing the Rashtriya Avishkar Abhiyan. In partnership with Oracle, it is being planned to introduce innovative programmes for teachers, increase outreach and develop TLM as a strategy to promote innovative way of thinking.

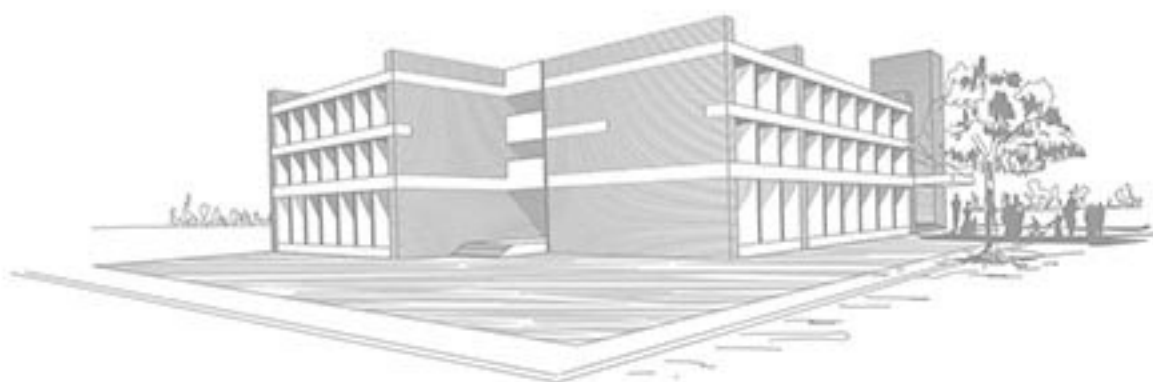
After successfully implementing seven phases of the Science Express, VASCSC was once again entrusted with responsibility of managing the eighth phase of Science Express by NCSTC, Dept. of Science & Technology, Govt. of India. As Science Express Climate Action Special (SECAS), the SE Phase VIII is focusing on Climate Change, Science and Technology. The eighth phase scheduled till 7 May 2016 conveys the message of Climate Action to a diverse group of people including students and teachers through the exhibition and activities. This massive outreach programme has so far, received over 1.52 crore visitors across India and six entries in the Limca Book of Records!

The Centre makes concentrated efforts for developing children's interest and cultivating understanding of difficult Science and Mathematics concepts through several interventions. School Science Forum is one such programme aimed at helping students of std. 5-9 understand curriculum based concepts better. Its popularity increased as it entered its fifth year and to keep up with the growing demand, more batches were added to accommodate more children. Summer Programme, Science Outdoors, etc. gave students the chance to experience the fun side of Science and were well-received. Advanced B. Sc. (Physics) was continued with aim to encourage students to pursue higher education and careers in Science. The Centre also made some interventions to reach out to the unreached through unique partnerships. Programmes like the Summer Science School and Winter Science School supported by KHS Machinery Pvt. Ltd., Children's Workshops supported by Cairn Energy and Science Education Activities at Ambli Primary School supported by Dr. Sureshbhai D. Bhatt were some such initiatives. Underprivileged children were presented with opportunity to experience the Joy of Science and delve deeper into it through these activities. We hope this experience will help nurture these young children into future scientists of India.

A large number of benefactors of Centre's activities are teachers who participate in its capacity building programmes. As part of the organizing committee of the 8th National Teachers Science Congress organized by NTSCC, DST, the Centre shared its experiences on a national level platform. With continued support of IBM India Pvt. Ltd., 20 more 'Science and Mathematics Hands-on' workshops have been planned at different districts of Gujarat out of which 9 have been conducted. With support from American India Foundation, intensive effort was made for teachers at Kutch as each participant received eight days of training inputs. Similar workshops were conducted at different locations to help teachers in effectively transacting Science and Mathematics concepts in their classroom through hands-on methodology. The workshop learning was reinforced by providing participants with set of carefully selected resource material. New Teaching Learning Material development work was carried out. Besides developing new content, transadaptation of existing content was done for benefit of teachers.

All this was made possible due to efforts of many people. I would like to thank our Chairman Shri Sam Pitroda and the Board Members for their invaluable inputs, support and guidance. I would also like to thank all our well-wishers, project partners, teachers and students who have in many ways contributed to Centre's efforts in popularizing Science.

Dilip Surkar
Executive Director, VASCSC



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.

With its origin as 'Group for Improvement of Science Education (GISE)' in 1963 from Physical Research Laboratory (PRL), Ahmedabad; the Community Science Centre has evolved a long way to the present times. It was founded by India's renowned scientist, Dr. Vikram A. Sarabhai on 1 June 1966 to encourage scientific thinking and innovative science teaching. The Centre was later renamed as 'Vikram A Sarabhai Community Science Centre', to associate its name with that of its founder.

Its mandate of spreading the joy of science by reaching out to different segments of the community is best illustrated by the Centre's logo itself. 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 for change. VASCSC aims to bring about change by providing a common platform to all these groups.

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 of education 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 sustainable and ever-lasting.

The Centre has several facilities for participants to explore the various dimensions of Science and Mathematics. The Centre houses well-equipped laboratories viz. Biology, Chemistry, Physics, Electronics, Model Rocketry, Mathematics & Computer; Innovation Hub; Science Playground; Library; Science Hobby Workshop and Science Shop.

VASCSC has to its credit a number of firsts which include an interactive exhibition space, open laboratories, Mathematics Laboratory, Science Playground, active use of computers in science education and developing interactive educational programmes; most of which have become a part of mainstream today. The Centre's efforts for improving the quality of science education and popularization have received recognition from several agencies.



National Award for Outstanding Efforts in Science and Technology Communication' from Dept. of Science and Technology, NCSTC, Govt. of India (2008)



The 'Times of India Social Impact Award' for Education (2011)

The School Science Programme of VASCSC is aimed at school children ideally from Std. 5 and above, to develop their interest and nurture curiosity towards science. School children usually find these subjects boring, difficult or far-fetched from their own lives. The programme presents Science and Mathematics in a simple and engaging manner to the children. At the same time, it leans heavily on twin aspects of inquiry and creativity. Through this programme, it is attempted to show the connect between Science the children learn in their classroom and their everyday life and experiences. The children are provided with a quality Science learning experience, which they may have not gone through before.



Science concepts from curriculum or even outside of it are demystified using effective methodologies like demonstrations, experiments, projects, science shows, hands-on activities, film shows, AV techniques, etc. In effect, the programme orients and nudges the school children towards Science. The following activities were conducted as part of the School Science Programme in year 2015-16:

Open House

The Centre and its facilities are open for 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 or with guidance from the educators at the Centre. Visitors can avail 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, Maths; and Science Playground are freely accessible to people

of all age groups. The Centre's library can be used for reading and for referring to the reference books for study or for project activities. A collection of interactive exhibits, models, teaching aids and experiments are showcased in the Quadrangle, the upcoming Innovation Hub space and laboratories which are regularly used by the visitors, students enrolled in programmes and parents.

School Visits

School Visit programme is conducted for school groups visiting the Centre. A dedicated team facilitates the school visits and conducts structured session for them. A Science Show consisting of demonstrations, experiments, hands-on and group activities, games, innovative TLM, film, talk, etc. is conducted for the group. This is followed by the exposure of students to Centre's lab facilities and their spending 'interactive time' in the Quadrangle and Science Playground. The School Visit Programme aims to create students' interest in Science and help them in dealing with it more confidently, after being exposed to its interesting facets. Efforts are made to make the visit more meaningful by orientating them to innovations and promoting innovative thinking. The school children are introduced to the activities of the Centre and encouraged to participate in the regular programmes. Many times, informative takeaway material is also provided to the children or teachers.

Educational Visit to VASCSC is a regular feature in many local schools' educational visit plan. School groups from other cities also visit the Centre. The visiting students belonged to different grades right from pre-school to higher secondary. Several college



and institution groups also visited the Centre and they too were engaged in interactive sessions. Students are excited to visit the Centre and always go back with scientific inputs. It has been seen that many students who visit the Centre as part of their school group, visit once again on their own and eventually start participating in the Centre's activities and events. This, in all probability, is the beginning of their life-long association with science. Around 2500 students and 230 teachers from 43 schools visited the Centre during the year, as part of School Visit programme.

Student Visits

The Centre's laboratories are well-equipped to conduct school level experiments. Students utilize the lab facilities to perform curricular and also, extracurricular experiments. This is classified as Student Visits where students visit individually to perform practicals and investigatory projects, which are mandated in their curriculum.

Necessary equipment, material and guidance are provided to students for their school projects, science fair projects and for trying out innovative ideas. The number of students approaching the Centre for school projects and science fair projects has increased over the years. Many a times, 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 the Centre's educators.

More than 6000 students from different schools performed curriculum-based practicals and projects in the Centre's Biology, Chemistry, Computer, Electronics, Mathematics and Physics laboratories.



Diwali Vacation Batches

To cater to students during their Diwali school break, one batch each of some short duration modules were conducted during 17 - 28 November 2015, details of which are given in the following table. 80 students participated in the programme.

Module	Age Group	Duration
Do it Yourself	Std. 1-3	1 week
Young Rocketeers - I (Water Booster)	Std. 6-7	1 week
Robotics Module - I	Std. 6-7	1 week
Little Scientist	Std. 2-4	1 week
Chem For Kids	Std. 1-4	1 week
Picture Editing	Std. 5-7	1 week
Fun with Visual Programming	Std. 5-7	1 week
GSEB Sem - 4	Std. 12	1 week
GSEB Sem - 2	Std. 11	1 week

Science Outdoors

The Science Outdoors Programme was conducted with an idea to use the outdoors as a learning resource for understanding basic science concepts, in addition to environmental concepts. This programme aimed to dispel the common view that science learning can happen only within the confines of a classroom or a laboratory. Natural surroundings and phenomena in the outdoor setting are a great opportunity for introducing scientific concepts, observing them in real life and understanding the correlation between various scientific phenomena and processes occurring around us. It is an effective medium to understand the science concepts that students learn at school by actually seeing its application in their own lives. The concepts learnt in this manner are retained by them life-long. Science Outdoors was organized for Std. 5-9 students in which 93 enthusiastic students participated. Two trips were organized at different locations and provided the students with a unique learning experience.

A trip was organized to Taranga Hills in Satlasana, Gujarat on 2-3 January 2016. This trip had participation of 41 students. In this educational trip, the participants got an exposure and to the rural life of India and to different agricultural practices. They learnt about vermicomposting, importance of biogas, different irrigation techniques, etc. They also visited Dharoi Dam and enjoyed learning about the local flora and fauna while trekking in the Aravalli Hills ranges. Other activities like astronomy and science behind magical tricks were also conducted.

The second trip was organized to Halvad, Gujarat on 9-10 January 2016 and had 52 participants. This was an overnight trip where the participants camped at CEE's Field Office campus. The uniqueness of the location was that it is close to the Little Rann of Kutch, the only home to Indian Wild Ass. Visit to the Wild Ass Sanctuary and salt pans gave them an opportunity to learn about scientific phenomena like evaporation, mirage, physics and chemistry principles involved in salt formation process, challenges faced by salt pan workers, local flora and fauna of the Little Rann, etc. In addition, Astronight and Science behind Magic activities were also conducted to maximize the learning opportunity.



Ambli School Programme

With support from Dr. Sureshbhai D. Bhatt Charitable Trust, VASCSC continued its interventions to improve quality of Science, Mathematics and Computer education at Ambli Primary School, for the second year. Through this intervention, efforts were made to increase awareness of science, create interest and provide a holistic learning, where the aim was to strengthen the basic concepts of Science, based on which higher learning could be attained.

Conducting Periodic Sessions: The Centre's resource persons conducted sessions based on hands-on approaches for students of Std. 6 & 7, throughout the year. The children themselves participated in the activities, experiments, model-making and learnt difficult Science concepts with ease. These sessions supplemented the ongoing input that the students got from their school and reinforced their learning. The school teachers also attended the sessions and were oriented towards the activities which they could replicate in their regular classroom teaching.

For each standard, 24 sessions of two hours' duration each, were conducted during July 2015 - March 2016. Sessions for Std. 6 were conducted every Wednesday while those for Std. 7 were conducted every Friday. The sessions were aligned with school curriculum and the schedule was carefully prepared so as to complement the topics which were being addressed in their class at that point of time.

For Std. 6, topics covered included Simple Machines, Acid, base & Salt, Number Concept, Living & Non-living, Light, Perimeter, Area, Water, Seed, Sound, Identify the Plants, Introduction to Algebra, Hobby workshop, HCF & LCM, Heat, States of Matter, Conservation of Environment, Fractions, Energy, Air, Basic Astronomy and preparing an Innovative science project. The topics dealt with in sessions of Std. 7 included Food and Nutrition, Integers, Magnetism, Water, Integers, Cell, Force, Motion and Speed, Fun with Chemistry, Algebra, Human body, Sources of Energy, Geometry, Model Rocketry, Electricity, Separation of Substances, Human Body, Volume, Preparing an innovative science project, Elements, Compounds and Mixtures, Pollution, Construction of triangle and our Solar System.



Teachers Orientation Workshop: A Mathematics Orientation Workshop was conducted for the school's 15 teachers during 22-24 September 2015. The workshop content included orientation on using mathematics TLM effectively in the classroom.

Support for Computer Education: The school has several computers but absence of trained teachers to impart computer education was a challenge faced by the school. VASCSC provided additional support for making the existing computers operational, accessible to the students and initiating the students into computer education. For this purpose, one full time computer resource person and computer

teacher were recruited and computer sessions were conducted for students of std. 5-8. Topics such as Tux typing, Tux Paint, Writer, Powerpoint, Calc, Ubuntu OS, etc. were covered. During the academic year 28 sessions were conducted for std. 5, 26 sessions for std. 6, 24 sessions for std. 7 and 24 sessions for std. 8.

Session at Army Cantt.

A half day fun-filled session was conducted by VASCSC team at Army Cantt. Ahmedabad on 9 May 2015. The session included demonstrations, hands-on activities and competitions for children from armed forces background. The children enjoyed and appreciated the activities.

Summer School

With support from KHS Machinery Pvt. Ltd. through Yuva Unstoppable, VASCSC conducted a new programme - Summer School for underprivileged children, in collaboration with CEE. The aim was to provide the students, who mostly came from municipal schools, a unique and first-of-its-kind learning experience. The Summer School focused on imparting difficult Science and Mathematics concepts in a fun-filled manner. The children utilized their summer vacation constructively and also learnt concepts which would be of help to them at school.

Half day sessions were conducted for ten days, giving the participants ample space and time to engage in hands-on activities. The participants were divided into smaller groups for one-to-one interaction.

Interesting concepts from Science, Mathematics and Environment were transacted through experiments, demonstrations, hands-on activities, model-making, nature trail, games, quiz, power point presentations, videos, group work, discussion and interaction with eminent persons. In addition to activities and experiments, the children individually prepared models. Scientific material like magnets, magnifying glass, litmus papers and periodic table were given away to the participants to explore on their own at home. Interesting resource material in Gujarati, was given for further reading.

The topics covered included Sound, Frequency, Newton's third law of motion, Rocketry, Simple electric circuit, Conductors & insulators, Magnetism, Sound, Reflection of Light, Optical Illusions, Revolution of Moon, Human Respiratory system, Human fingerprint patterns, Balanced diet and its components, Binary number system, 3D solids and their nets, Tetrahedron, Microscopy, Plant cell, Centre of gravity, Environment and Conservation, Surface tension, Heat Convection, Properties of Hydrogen & Oxygen, Chemical reactions, Acid-base, Properties of Water and Air, Science behind Magic, etc.

The Summer School was conducted by VASCSC during 18 - 29 May 2015 at VIKSAT Resource Centre, Ahmedabad. The programme received students from std. 4-10. 107 children from Thaltej and Vatva areas of Ahmedabad participated and found the programme interesting and useful.



Winter Science School

Following the success of Summer School, VASCSC conducted a similar programme - Winter Science School, with support from KHS Machinery Pvt. Ltd. The Winter Science School programme aimed at creating an interest among the students in Science and Mathematics through hands-on activities. This was a unique experience for the participants who were studying in government schools and lacked exposure to activities of this kind. Concepts from school curriculum were taken as the base on which activities were developed and conducted.



The Science School was aimed at students from std. 6-8. Students explored the world of Science through model-making, experiments, activities, movies, demonstrations, games, puzzles and nature trails. Topics such as Laws of motion, Magnetic levitation, Sound, Light, Energy, Centre of gravity, Conductors & non-conductors, Electric circuit, parallel & series connection, Our solar system, Astronomy, 3D shapes & nets, Quick multiplication, Constituents of food, Food chain & web, Factors important for plant growth, Light, Optical illusions, Acid, base & salt, Crystalline structure of salt, Air, Properties of hydrogen gas, fun chemical reactions, useful internet educational resources, Identification of common birds & plants, science behind magic, paper folding, etc. Students worked in small groups or individually. Resource material was provided to the students for further reading and performing activities at home.

The Winter Science School was conducted by the Centre during 7-12 December 2015 at VIKSAT Resource Centre, Ahmedabad. 104 children studying in std. 6-8 from govt. primary schools of Hirapur, Haraniyav, Bhitiya, Badodara, Khat No Kuvo, Bhuval and Rampura participated.

Workshops at Suvali-Hazira

With support from Cairn Energy India Ltd., VASCSC conducted training workshops for teachers and students of Suvali Primary School and Junagam Primary School in Hazira-Surat to strengthen their understanding of Science and Mathematics. In the workshops, participants were directly engaged in activities which helped them understand and retain difficult Science concepts. The following activities were conducted under this project:

Model Rocketry Workshop: Two model rocketry workshops were conducted for students from std. 6-8. The participants fabricated water booster model rockets from simple material like PET bottles and cardboard and then launched the rockets. This workshop was an opportunity to impart several science concepts through this fun activity. The first workshop was conducted at Suvali Primary School on 28 & 30 January 2016, in which 43 students participated. The second workshop was conducted at Junagam Primary School during 29-30 January 2016, in which 55 students participated.



Do It Yourself Workshop: In these workshops, the students from std. 6-8 themselves prepared science models and toys using simple, everyday material. They prepared models and performed activities from school science curriculum based concepts like Light, Friction, Sound, etc. Through these hands-on activities, they learnt about the principles involved in working of these models. Two such workshops were conducted. The first workshop was conducted at Junagam Primary School on 28 January 2016, in which 54 students participated. Second workshop was conducted at Suvali Primary School on 29 January 2016, in which 46 students participated.

Teachers Training Workshop: This workshop introduced the teachers from std. 6-8 to hands-on approaches in Science and Mathematics education. The participants made models and performed activities based on school science curriculum. The workshop was conducted during 29-30 December 2015 at Suvali Primary School, Hazira in which 15 teachers participated.

Science Day Event

VASCSC team conducted innovative science activities for children during the Science Day event on 12 March 2016 at IIT Gandhinagar. The event was organized by RMSA, Gujarat and IITG. The activities conducted by the Centre included competitions, workshops, games, science activity stalls, etc. for children from Std. 3-10.

The workshops included Model Rocketry, Mathematics and Science Hobby Workshops. In the Model Rocketry Workshop, the participants fabricated and launched water booster model rockets. In the Mathematics workshops, students were engaged in model making, games and puzzles. In the Science Hobby Workshop, participants themselves prepared science models and toys using simple, everyday material. The Science Art painting competition gave the participants an opportunity to



not only express their creativity but also explore several facets of Science. Green Games, based on concepts like food chain, food web, ecosystem, biodiversity, water and energy were conducted. An interactive space was created where TLM, models, puzzles, books developed by Centre were displayed and demonstrated. Around 1000 students from in and around Gandhinagar participated in the activities.

National Olympiad Test

The National Standard Examinations for National Olympiad conducted by Indian Association of Physics Teachers (IAPT) were held at VASCSC on 22 November 2015. 96 students appeared for the exams held for Physics, Chemistry, Biology, Astronomy and Junior Science.



The School Science Forum (SSF) programme successfully entered into its fifth year. This is a syllabus oriented, year-long programme offered for students of Std. 5 to 9. The SSF continues to be one of the most popular programmes of the Centre. Most of the participants have enrolled themselves during successive years and benefited from the sessions in gaining better understanding of curriculum-based Science and Mathematics concepts.

The focus of SSF is on making the learning of Science and Mathematics interesting and engaging for school children. Experiments and activities form an integral part of the sessions conducted in the Centre's various labs, as a means to strengthen the basic concepts. Sessions pertaining to Biology, Chemistry, Physics, Mathematics, Electronics, Computers, Environment, Science Project Making, Astronomy, Model Rocketry, Environment, etc. are included to provide holistic understanding and give an idea regarding the interdisciplinary nature of Science. The interactive sessions give the participants a platform to share their ideas, develop scientific temper, boost their confidence and foster in them a positive attitude towards learning Science and Mathematics. It complements the input that the students get from their school and hence, reinforces their learning. As SSF is spread over an academic year, sustained efforts can be made by the Centre's team and ample time is available for the students to explore and understand concepts. The sessions are conducted in both English and Gujarati.



In the academic year 2015-16, the SSF was conducted during 30 June 2015 - 27 February 2016. For each standard, 30 sessions of one and half hours

duration each were conducted, which covered curricular topics that required practical input as well as educational visits. In addition to the sessions, educational visits were conducted to places like The Serenity Library, NFD campus, etc. for providing exposure to topics such as astronomy, environment, bird watching, ecology, etc.



The sessions for Std. 5 were based on curricular topics such as States of matter, Rocks and minerals, Air, Chemistry project, Fun with Chemistry, Seed and its germination, Electricity and circuit, Food and nutrition, Health & hygiene, Microscopy, Human body, Energy, Astronomy, Light, Sound, Simple machines, Self-watering plants, Making hand sanitizer, Balancing butterfly, Science around us, Urban wildlife, Number concept, Measurement, Factor-Multiple, LCM, HCF, Fractions, Decimal fractions, Geometrical concepts, MS Word and MS Paint.

The sessions for Std. 6 included topics such as Acid, base and salt, Separation of compounds, Factors affecting solubility, Experiments with water, Fun with Chemistry, Food and nutrition, Electricity and circuit, Experiments with plants, Adaptation, Human body, Reduce-Reuse-Recycle, Motion and measurement, Astronomy, Light, Magnet, Air, From fibre to fabric, Sprinkling bottle, Paper circuit, Science behind magic, Science games, Integers, Percentage, Introduction to Algebra, Measurement, Geometrical tools, 3 D Shapes, MS Power Point, MS Word, MS Excel, etc.

Sessions for Std. 7 were related to Element, compound & mixture, Making of gases, Chemical and



physical changes, Experiments with water, Fun with Chemistry, Force and motion, Astronomy, Light, Heat & Temperature, Lever, Nutrition Biology, Soil Science, Human body, Forest and adaptation, Fruit, flower and pollination, Solar cooker, Goods from the Woods, Science model, Design your experiment, Explore your surroundings, Integers, Algebraic expressions, Triangles, Symmetry, Measurement, 3D Shapes, MS Excel, Electricity and circuit, etc.

Sessions of Std. 8 in SSF covered topics like Structure of atom, Metals and non-metals, Combustion reaction, Chemical effects of electric current, Chemistry investigatory project, Crop production, Microorganisms, Plant and animal conservation, Cell structure, Air and water pollution, Force and Pressure, Astronomy, Electricity and Circuit Light, Sound, Model Rocketry, Science communication, Debate, Algebraic Identities, Triangles, Quadrilaterals, Circles, Visualizing solid shapes, Volume, MS Word, Computer and MS Excel.

In Std. 9 the sessions were based on topics such as Properties of matter, Chemical bonding, Chemical reaction, Chemistry investigatory project, Force and laws of motion, Astronomy, Work, Energy and

Archimedes' Principle, Gravitation, Sound and wave motion, Cell and tissue, Plasmolysis, Osmosis, Herbarium, Human body, Biodiversity, Solid Shapes, Algebraic Identities, Real Numbers, Statistics – Probability, Triangles, Circle, Design your experiment, Science around us, Science communication, Electricity and circuits, Model Rocketry, MS Publisher (Web Designing), MS Excel, etc.

Over 800 students from different schools of Ahmedabad enrolled in SSF. The concepts learnt as a part of the programme have been of immense help to them in dealing with their school curriculum. As a result of the overwhelming response from students, more batches were launched, increasing the number of batches to 42 and also the student intake. More than 800 students were enrolled in this programme.

Day	No. of Batches of SSF				
	Std. 5	Std. 6	Std. 7	Std. 8	Std. 9
Tue	2	2	2	2	-
Wed	1	1	1	1	1
Thu	2	2	2	2	1
Fri	1	1	1	1	1
Sat	2	2	2	2	2
Sun	1	1	1	1	1

Summer Programme is one of the most popular and sought after programme of the Centre. It is organized during the school summer vacation for children to engage in Science activities with fun, in a stress-free atmosphere. The children are able to utilize their vacation time constructively by exploring the world of Science, Mathematics and Computers through hands-on activities.

The Summer Programme 2015 was conducted during 21 April - 13 June 2015. Through the programme, 155 batches of 39 different modules were offered. Astronight sessions were conducted on 28 April & 23 May 2015. The programme received an overwhelming response with 2577 participants. Besides those from Ahmedabad, several participants were received from across and outside Gujarat. These students specially traveled to Ahmedabad to attend the Programme.

The programme schedule was compiled in form of a brochure and distributed to ensure wide dissemination of information and larger participation. The Centre's website, social media and notice board were used to display information. However, there was huge publicity by the word of mouth, due to the

positive experiences of previous participants. The programme modules were based on astronomy, biology, chemistry, computers, electronics, mathematics, model rocketry, physics, science hobby, general science, robotics, innovations, photography and other such interesting themes. Several new modules were introduced as compared to the previous year in order to offer more variety to the participants.

The programme catered to age groups starting from five years onwards. Each module was typically of 1-2 weeks' duration and gave participants fairly good time span to involve in activities as per their interest. Each module was designed so as to present the participants with an opportunity to individually explore, create and learn through activities, experiments, model-making, games, outdoor trips, etc. The list of the modules offered under Summer Programme 2015 is given on the following page.

Pre-summer vacation batches were also conducted during 17 - 28 March 2015, during which 19 batches of 12 different modules were offered and 344 students participated.



Module	Age Group	Duration	No. of Batches
Astronomy			
Astronomy - Juniors	Std. 5 - 6	1 week	2
Astronomy - Seniors	Std. 7 - 9	1 week	2
Biology			
Little Scientist	Std. 1 - 3	1 week	8
Microscopic Exploration	Std. 5 - 7	1 week	4
Biology Investigation	Std. 8 - 12	1 week	2
Science Exploration	Std. 4 - 6	1 week	2
Budding Biologist	Std. 5 - 7	2 weeks	2
Chemistry			
Chem 4 Kids	Std. 1 - 4	1 week	8
Chemistry Hands-on	Std. 8 - 10	1 week	3
Fun with Chemistry	Std. 5 - 7	1 week	8
Computers			
Fun with Computer	Std. 1 - 3	1 week	5
Animation for Kids	Std. 6 - 8	1 week	4
Picture Editing	Std. 5 - 7	1 week	4
Learning with LOGO	Std. 3 - 4	1 week	3
Fun with Multimedia	Std. 5 - 7	1 week	4
Fun with 3D Paint Brush	Std. 6 - 8	1 week	4
Computer Hardware	Std. 7 - 10	2 weeks	2
Electronics			
Electronics For You	Std. 5 - 6	1 week	4
Electronics World	Std. 7 - 10	1 week	4
Electronics & PCB Designing	Std. 6 - 10	1 week	5
Mathematics			
Fun with Maths	Std. 5 - 6	1 week	5
'N' Joy Maths	Std. 3 - 4	1 week	6
Young Mathematician - I	Std. 7 - 8	1 week	2
Young Mathematician - II	Std. 7 - 8	1 week	3
Model Rocketry			
Young Rocketeers - I (Single Stage)	Std. 4 - 6	1 week	3
Young Rocketeers - I (Water Booster)	Std. 6 - 7	1 week	3
Young Rocketeers - II (Cluster Engine)	Std. 7 - 9	1 week	2
Physics			
Fun with Physics - Juniors	Std. 5 - 6	1 week	4
Fun with Physics - Seniors	Std. 7 - 9	1 week	4
Robotics			
Robotics Module - I	Std. 6 - 7	1 week	4
Robotics Module - II	Std. 8 - 12	1 week	3
General Science			
Book Buddies	Std. 4 - 6	1 week	2
Learn Photography	Std. 5 & above	1 week	8
Science Funday	Std. 2-4 / 3-5 / 6-8	3 hours	1 / 3 / 2
Science Hobby Workshop - DIY I	Std. 1 - 3	1 week	6
Science Hobby Workshop - DIY II	Std. 5 - 7	1 week	4
Summer School - Juniors	Std. 4- 6	2 weeks	2
Summer School - Seniors	Std. 7- 9	2 weeks	2
Young Science Innovators	Std. 5 - 7	1 week	6

Advanced B.Sc. (Physics)

Physics is central to our society and forms the foundation of many areas of research. Physics can be found in nearly every job sector. With this background and to motivate students towards research, VASCSC jointly with Gujarat Science Academy and St. Xavier's College organized a rigorous summer programme on fundamental topics of Physics called the Advanced B.Sc. (Physics) Summer Programme.

This residential programme was conducted during 16 May - 5 June 2015 at St. Xavier's College, Ahmedabad. It was primarily meant for students studying in second year B.Sc. with Physics as a subject. The programme aimed at providing a firm background in Physics. The course was taught by

scientists from reputed research institutions including Physical Research Laboratory (PRL) and Institute for Plasma Research (IPR), using methodologies like assignments and problem solving, presentations, tests, career guidance in Physics, visit to research institutes and talks by eminent scientists from agencies like ISRO, etc. 37 students from science colleges all over Gujarat enrolled in the programme after undergoing a tough selection process.

This programme has been beneficial in shaping the future of the students. Several previous participants of this programme are pursuing higher studies in some of the best science and technology institutes of India, while a few are working as scientists in research institutes in Physics and allied subjects.

E

VASCSC has started the process of setting up an Innovation Club at its premises. This project is supported by the National Council of Science Museums (NCSM), Ministry of Culture, Govt. of India under the 'Scheme for Promoting Innovation, Creativity and Engagement in Sciences (SPICES)'. Since a long time, VASCSC has been carrying out innovative activities to improve the quality of Science education and also promote a culture of innovation. The Project, thus, provides an opportunity for extension of these activities and scaling up. The Project has provision for setting up new spaces for users to tinker, explore, try out new ideas and innovate. The Hub is expected to be vibrant with activities focusing on innovation and creativity. The Innovation Hub will have the following facilities which can be utilized by students, teachers and others who would like to explore their innovative ideas.



Innovation Hub

A. Discovery Hall: This area will house interactive science exhibits and experiments to create excitement for science through exploration and discovery of underlying principles. This will help in promoting logical thinking.

B. Innovation Resource Centre & Hall of Fame: This space will be used to showcase innovative ideas and products that have transformed our lives. Inspiring stories which resulted in such innovations will be shared. Besides these, samples of appropriate technology and traditional knowledge systems, art and craft, etc. shall be exhibited.

C. Idea Lab: This is an Innovation Laboratory having facilities to pursue creative and innovative activities that involve model making, design and fabrication of useful gadgets, basic science experimentation, teaching-learning aids for effective teaching, etc. and by making use of scrap creatively. Students will generate innovative ideas to create an idea bank. The best ideas will be selected for further experimentation.

- Tod Fod Jod Corner: This space will provide opportunity to tinker and explore, where the activity of 'breaking and making' will nurture the spirit of inquiry. Students will learn to do things with their own hands - dismantle and reassemble devices or gadgets.
- Kabaad se Jugad Corner: Space where users can engage in making useful things from waste and help in nurturing the creativity.

- **Idea Box:** The ideas generated as a result of activities in the Lab will become a part of the idea box to be pursued further.

D. Design Studio: The Studio will offer creative environment to facilitate the designing of various objects, products, etc. as part of innovation process.

The Innovation Hub Project work was commenced during 2015-16. The Centre's team participated in a brain storming meeting organized at the Centre on 24 October 2015 in presence of Shri Chander Mohan, Head SEED & KIRAN Division, Dept. of Science & Technology, GoI and Shri Dilip Surkar, Executive Director, VASCSC. The meeting resulted in generating new ideas and strategies for moving forward. A Core team was constituted from the Centre's staff members to facilitate implementation of the Project. An Architect & Engineering Consultant firm was engaged for looking into design and construction of newer facilities for the Innovation Hub.

The work on developing the Discovery Hall started. Some existing spaces, including the Quadrangle at the Centre is being remodeled and refurbished

to house newer interactive science exhibits. The Centre is known to be the pioneer of setting up an interactive exhibit space. The Quadrangle is such a facility existing within the Centre and it was natural to further develop it as Discovery Hall of the Innovation Hub. The contributions of some scientists have been identified to be showcased in the Hall of Fame. Work on content development for the same in regional language is under progress.

Students' ideas for innovative science projects were facilitated under the Idea Lab. Mr. Harshit Zaveri and Mr. Anirudh Jalan, Std. 6 students of Maharaja Agrasen developed 'Snake Alert Alarm' model. Mr. Dev developed a 'Portable Air Cooler Model' and a 'Robo Snake' model. VASCSC Model Rocketry team developed new designs of model rockets for children viz. Paper rocket, Arrow rocket and Matchbox rocket which can be made from easily available materials. To enable young students from Std. 6-9 to tinker and learn about computer hardware, a module was developed. By actually disassembling and reassembling of a PC, the students could easily learn about parts of computer, their functions and working as well as troubleshooting.



F Science Express Climate Action Special

Introduction

Science Express is a flagship programme of the Dept. of Science & Technology (DST), Govt. of India. It is an innovative mobile science exhibition mounted on a 16 coach AC train, traveling across India since Oct. 2007. Science Express has become the largest, the longest running and the most visited mobile science exhibition and has six entries in the Limca Book of Records.

DST has entrusted VASCSC, Ahmedabad with the task of managing the Science Express across India since its inception in 2007. VASCSC's team of qualified, trained and highly motivated Science Communicators traveling with the train explain and interpret the exhibition, facilitate the visitors and conduct the complementary activities.

Till Feb 2015, Science Express had completed seven phases in the country. Science Express Phase I to IV showcased cutting-edge research in Science and Technology being carried out worldwide. Phase V to VII was based on the theme of biodiversity and as 'Science Express Biodiversity Special (SEBS)', it showcased the rich biodiversity of India and its conservation measures.

Science Express as SECAS

Phase VIII of Science Express as 'Science Express Climate Action Special (SECAS)' focused on Climate Change and Science & Technology. SECAS was scheduled to travel from 15 October 2015 to 7 May 2016. VASCSC successfully carried out its role as the implementing partner of this prestigious project.

SECAS was a unique collaborative initiative of DST, Ministry of Environment, Forest & Climate Change (MoEFCC), Department of Biotechnology (DBT) and Ministry of Railways, Govt. India, Centre for Environment (CEE) and VASCSC. SECAS aimed to contribute towards increasing understanding of the science of climate change, the observed and anticipated impacts, and different possible responses as well as Innovations, Science & Technology.



The year 2015 was expected to be a decisive year as 190 nations would be gathering in Paris to discuss a new global agreement on climate change during the 21st session of the Conference of the Parties (COP 21) to the 1992 United Nations Framework Convention on Climate Change (UNFCCC) and the 11th session of the Meeting of the Parties (CMP 11) to the 1997 Kyoto Protocol. Keeping this in focus, Science Express, in its eighth phase was redesigned on the theme 'Climate Change' and was showcased as SECAS.



The previous three phases of Science Express as Biodiversity Special showcased the myriad biodiversity of India. Thus it was rational to shift the focus to the theme 'Climate Change' as it will affect the biodiversity of not just India but the entire globe.

SECAS Flag Off

SECAS was flagged off on 15 October 2015 from Delhi Safdarjung Railway Station by Dr. Harsh Vardhan, Hon'ble Minister of Science & Technology and Earth Sciences; Shri Suresh Prabhu, Hon'ble Minister of Railways; Shri Prakash Javadekar, Hon'ble Minister of Environment, Forest and Climate Change and Shri Y. S. Chowdary, Hon'ble Minister of State for Science & Technology, Govt. of India. Several other dignitaries and officials from Indian Railways, DST, MoEFCC, DBT, CSIR, CEE and VASCSC were present. Till 31 March 2016, SECAS was showcased at 53 out of scheduled 64 stations and was experienced by 19,66,048 people.

जलवायु परिवर्तन जैसे महत्वपूर्ण लेकिन कठिन विषय पर दुनिया का लोगों तक बड़े पैमाने पर पहुँचाने का यह पहला प्रयास है। पूरी टीमने अच्छा काम किया है। प्रश्न समझने से लेकर इस विषय में खुद क्या करें यह इस में बयां होता है। Buck up Science Express Climate Action Special 2015 !"

- Shri Prakash Javadekar
Hon'ble Minister of Environment, Forest
& Climate Change, Govt. of India

About the exhibition

The state-of-the-art exhibition aboard SECAS aimed to create awareness among various sections of society, especially students, as to how Climate Change can be combated through mitigation and adaptation. Of the 16 coaches of SECAS, MoEFCC had put up exhibition in coach 1 to 8, related to

"It gives me tremendous pleasure to be a part of this flagging off ceremony of our state of the art 'Science Express'. Today history has been written by planning climate action programme on such a big scale in our country along with first solar coaches exhibiting use of clean energy. I am sure the prestigious train shall take the powerful message of science to millions which shall help in the development of huge scientific temper and acumen in the country in future years. I thank all scientific and other technical people involved in this great endeavor. Best wishes."

- Dr. Harsh Vardhan
Hon'ble Minister of Science & Technology
and Earth Sciences, Govt. of India

various aspect of Climate change, the underlying science, impacts, adaptation activities, mitigation solutions and policy approaches in a easy to understand and interesting manner. Exhibition in coach 9 and 10 by DBT contained exhibits on Biotechnology for bioresources and nature conservation and recent biotechnological advancements made in India. Coach 11 by DST showcased Innovations in Science & Technology, augmented reality based model, Science Education, DST Scholarships & Schemes, Careers in S & T, etc.

Coach 12 housed the Kids Zone where children from std. 5 and below could participate in fun-filled activities, games and puzzles in Science, Maths and Environment. Coach 13 housed the Joy of Science (JOS) Lab for students of std. 6-10 to perform experiments and activities to understand concepts in Science, Maths and Environment in an interesting manner. A Discussion Centre-cum-training facility was also provided in this coach for orientation of teachers. As a new initiative, Solar Panels were installed on the rooftop of coach 11-13 of Science Express as a positive action against climate change.





Reaching Out

The reach of SECAS was extended beyond the exhibition and the on-board interactive spaces through the On-platform and Outreach Activity, to reinforce the message of SECAS to diverse group of people. The Platform activity was aimed to keep the visitors engaged meaningfully while they awaited their turn to enter the train. Demonstrations, puzzles, games, quiz, competitions, group activities, display panels, train exterior were used as methodology to impart the message of the SECAS. The SECAS team visited nearby schools and institutions and conducted Outreach activity. They took the students through the SECAS experience without actually visiting the train by conducting presentations, films, JOS/Kids Zone activities, etc. in the school itself. Informative take-away material was made available for wider distribution amongst schools and visitors. In addition, the SECAS team conducted several activities to celebrate commemorative days, given as follows:

- 106th Birth Anniversary of Dr. Homi Bhabha on 30 Oct 2015 at Suratgarh
- World Science Day for Peace & Development on 10 Nov 2015 at Amb Andaura
- World Television Day on 21 Nov 2015 at Samba
- National Milk Day on 26 Nov 2016 at Pathankot
- National Energy Conservation Day on 14 Dec 2015 at Agra
- World Wetland Day on 2 Feb 2016 at Bilaspur
- World Cancer Day on 4 Feb 2016 at Kumhari
- National Science Day on 28 Feb 2016 at Kadiri

"As amazing and inspiring as the previous train on biodiversity. Wish this train long life. The young science communicators deserve special accolades."

- Prof. R. Gadagkar
President, Indian National Science Academy

- Birth Anniversary of Dmitri Mendeleev on 8 Feb 2016 at Koraput
- World Wildlife Day on 3 March 2016 at Vellore
- Earth Hour on 19 March 2016 & World Sparrow Day on 20 March 2016 at Changanasari
- World Water Day on 22 March 2016 at Palakkad
- World Metrological Day on 23 March 2016 at Palakkad
- Celebration of International Year of Light 2015 and International Year of Pulses 2016



Web Presence

A dedicated website and social media accounts of SECAS were created to connect to a wider audience. Through these, updates about the project and activities were made easily available.

- www.scienceexpress.in
- www.scienceexpress.in
- www.scienceexpressphase7.wordpress.com/
- www.facebook.com/Science-Express-159008177473722/
- www.twitter.com/Science_Express
- YouTube channel
- SECAS 360° Virtual Tour

SECAS Statistics (15 Oct 2015 - 31 Mar 2016)

- **Total Visitors: 19,66,048**
 - Schools: 5,810
 - Students: 5,58,094
 - Teachers: 27,794
 - General public: 10,73,270
- **Students**
 - in JOS Lab: 61,696
 - in Kids Zone: 60,325
 - in Platform Activity: 1,59,958
 - in Outreach Activity: 23,731
- **Teachers Oriented: 1,180**

The Science Express has received over 1.5 million visitors since its inception in 2007.

Capacity building initiatives are undertaken by the Centre to motivate and empower individuals associated with the field of science education. The initiatives are targeted at orienting the science education professionals including school teachers, towards hands-on approaches in teaching. From time to time, the Centre organizes and conducts capacity building workshops and interactive sessions for school teachers and science educators. These workshops promote innovative methods in science teaching. Efforts are made to identify difficulties faced by the educators and develop remedies. The material developed keeping in mind these difficulties, can be then utilized as a part of the classroom teaching. These initiatives aim to build confidence of the educators for transacting science concepts in their classroom and developing interest and inclination of their students towards Science. The following workshops were conducted during 2015-16:

STEM Training for Teachers on Hands-on Approaches in Science & Mathematics Education

The STEM trainings conducted by the Centre in the previous year received a good response from the teachers. Hence, it was planned to conduct several more teachers training workshops in various districts of Gujarat to reach out to more number of teachers.

This project involving training of government school teachers on STEM related aspects, was supported by IBM India Pvt. Ltd. 20 training workshops were planned to be conducted till the end of 2016, to reach out to about 1000 teachers. Out of these, 9 workshops were conducted till March 2016 in which 437 teachers participated.



VASCSC team conducted STEM training workshops in Ahmedabad, Gandhinagar, Tapi, Botad, Patan, Mehsana, Chhota Udepur, Navsari and Valsad districts in which teachers from the respective districts participated. DIET centres of these districts of Gujarat provided the necessary support for conducting the workshops.

Sr. No.	District	Date of Workshop	No. of participants
1	Gandhinagar	11 - 12 Jan 2016	46
2	Tapi	28 - 29 Jan 2016	53
3	Botad	04 - 05 Feb 2016	40
4	Patan	09 - 10 Feb 2016	53
5	Ahmedabad (Urban)	11 - 12 Feb 2016	46
6	Mehsana	16 - 17 Feb 2016	51
7	Chhota Udepur	23 - 24 Feb 2016	47
8	Navsari	01 - 02 Mar 2016	42
9	Valsad	03 - 04 Mar 2016	59
Total no. of teachers trained across Gujarat			437

The workshops involved three components - Training, Resource material dissemination and Orientation on Teachers Try Science web resource. The two-day workshops consisted of Science and Mathematics sessions transacted through hands-on and demonstration methodology. Each participant was engaged in experiments, activities, model-making to explore various concepts from Biology, Physics, Chemistry, Electronics and Earth Sciences. Activities were designed so as to develop understanding, to reinforce the learning, and to build real world connections to concepts taught in the classroom. Through the workshop activities, it was conveyed that even simple everyday material could be effective in preparing activities for demonstrating Science and Mathematics concepts.

An orientation to the Teachers TryScience website was given to the participants to enable web based learning. Besides other resources, the website also hosts content transadapted in Gujarati by the Centre's team. Teachers found it useful as it was developed keeping in mind their need for material in local language. To reinforce learning from the workshop and support teachers further, quality resource material was provided to them. This included a set of carefully selected publications which could be placed in the school's library or science club.

"The experiments of Physics, Chemistry & Mathematics, and their models were very much like by me. The 2 day session was very much enjoyed by all. I did not feel like going back home as everything demonstrated and made by us in the hands-on session were very interesting..."

- Mr. Chintan Vyas, Teacher
Shri Marwad Prathamik Shala, Palanpur

Training Programme at Kutch

VASCSC team conducted two rounds of teachers training in Kutch, with support from American India Foundation Trust. The aim of the workshops was to introduce the participants to hands-on approaches in teaching of Science and Mathematics and also to strengthen their understanding of these subjects. This was a slightly intensive effort to build the capacity of the young teachers teaching students of Std. 6-8, as each participant received 8 days of training input.

The first round of 'Science & Mathematics Hands-on' workshops was conducted during 3 - 6 November 2016. Two groups consisting of 66 participants in all, underwent four days of training each, in the first round. The content was based on semester-1 topics in which the teachers were facing difficulty. The workshop for Group 1 was conducted at Lakadia, Kutch and consisted of 33 teachers. The workshop for Group 2 was conducted at Gram Swaraj Sangh, Nilpar, Kutch and also consisted of 33 teachers.

The second round of workshops was conducted during 18 - 21 February 2016. Two groups with a total of 64 participants, underwent four days of training each, in the second round. The content was based on topics of semester-2 addressing the actual problem areas faced by the participants in teaching of Science & Mathematics. Both workshops were conducted at Gram Swaraj Sangh, Nilpar, Kutch and had 30 and 34 participants respectively.



Mathematics Workshops

The Mathematics hands-on workshops aim to help teachers understand students' misconceptions, developing pedagogies that will maximize students' understanding of concepts and develop strategies to confront and overcome misconceptions, developing teaching aids which would help in understanding the concepts and engaging students' interest through activity-based learning as they see the connections between the mathematical concepts they are learning and their application in real life.



The workshops also cover aspects like setting up Mathematics Laboratory and its activities, non-formal mathematics and activity-based learning. Methodologies like demonstration, activities and model-making are utilized. The following mathematics workshops were conducted by VASCSC team during 2015-16:

- A 'Maths Lab Orientation Workshop' was conducted during 10-11 July 2015 at Army Public School, Jodhpur. 35 primary and secondary teachers from the school participated.
- A 'Mathematics TLM Orientation Workshop' was conducted during 22-24 September 2015 at Ambli Primary School, Ahmedabad. 15 teachers from std. 6-8 participated.
- A training workshop on 'Hands-on Approaches in Teaching & Learning of Mathematics' was conducted during 2-4 December 2015 at Mathematics Dept., V. S. Patel College, Bilimora. A group of 30 participants, were received in the workshop.
- A teachers training workshop was conducted during 20-22 January 2016 at Krishna Public School, Raipur, with support from IFIG, Raipur. 30 primary and secondary school teachers participated.

- A training workshop was conducted during 22-23 March 2016 at VASCSC for teachers teaching in Std. 6-8. The workshop was aimed at strengthening the basic concepts and addressing the difficulties faced by students in understanding abstract concepts. 12 teachers from in and around Gujarat participated.

Other Training Workshops

- A 'Science & Mathematics hands-on workshop' was conducted during 29 - 30 December 2015 at Suvali Primary School, Hazira - Surat. This workshop was supported by Cairn Energy India Ltd. The participants were engaged in activities, experiments and model-making to show them the relevance of these in making Science and Mathematics interesting for the students. Teaching aids were demonstrated for conceptual understanding. The teachers were also given a resource material kit in Gujarati. 15 teachers of Std. 6-8 participated in the workshop.

- A teachers training workshop on 'Hands-on Approaches of Teaching Science' was conducted during 7-9 January 2016 at DIET-Mahasamund, Chhattisgarh. The workshop was supported by ICICI Foundation for Inclusive Growth, Raipur. The participants were familiarized with how difficult science concepts can be dealt with through activities and model-making in their regular classroom teaching. The workshop focused on preparation and



use of models in teaching science concepts. 33 teachers teaching in Std. 6-8 of govt. schools participated in this workshop.

- Two batches of 3-day teachers training workshop on 'Hands-on Approaches in Science & Mathematics Education' during 16-18 March 2016 at VASCSC. The workshops were supported by GCERT, Gandhinagar. The teachers were oriented to the hands-on approaches of teaching science through self-involvement in activities, experiments and model-making. Their experience was enriched by giving away a set of resource material to each teacher. In all, 65 teachers from govt. upper primary schools from areas in and around Ahmedabad participated.



The Centre brings out books and learning aids to provide the end users with material that is authentic, engaging and relevant to them. The material is developed with the idea of providing quality material to students and teachers, which can be used by them for science teaching and learning. This material is brought out in English and Gujarati. Several books and user manuals for TLM are also prepared in Gujarati, keeping in mind the insufficiency of science based material in the local language.

In 2015-16, several existing publications were reprinted in big numbers as a result of their increasing demand. These include Why the Sky is Blue, Akash Bhuru Sha Maate, Vaignanik Dr. Vikram Sarabhai, Joy of Learning -2 and JOS notebook. Also, the following new publications and learning aids were brought out:

Science Wall Planner 2016

The Science Wall Planner is a unique theme based publication of the Centre where the year planner is fortified with useful scientific information. The Centre has been bringing out this product consistently since 2005 and has been well-appreciated. The users of this product comprising teachers, students and individuals, have found it useful for planning events, talks, activities, etc. based on the information provided in the Planner.



The year 2016 was observed as International Year of Pulses (IYP2016) by the United Nations. VASCSC Wall Planner 2016 was designed and developed based on this theme, in English. The aim was to create awareness among students and teachers about pulses as a primary source of protein and other essential nutrients. The Planner also contained

information about national and international days that are observed to mark important scientific events, birth anniversaries of eminent scientists and astronomical events. The Wall Planners were made available at Science Shop, sent to various institutions and included as takeaway item in various programmes of the Centre, including teachers training workshops.

Vigyan Drashti

The Vigyan Drashti is a Gujarati bimonthly wall magazine. It is published in a four-colour poster format, printed on both sides. Six volumes are brought

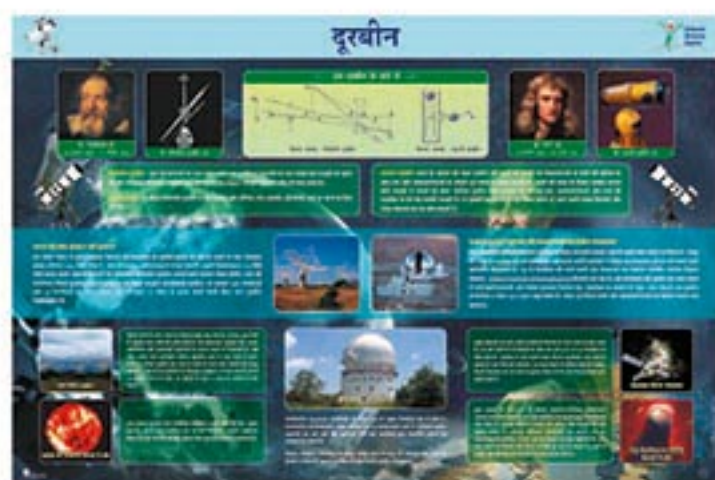


out in a year. One side displays articles, activities, experiments, latest in the world of science, puzzles and amazing facts related to Science and Mathematics. The other side displays a thematic poster series. It caters to age group of 10 years and above. A large number of teachers, students and schools subscribe to this wall magazine to learn more about scientific concepts, facts and latest developments. It serves as an effective science learning resource in local language. As the year 2015 was declared by UN as International Year of Light & Light-based Technologies, the posters in the Vigyan Drashti had information about various facets of light and related technologies, in a simple format. Six volumes were brought out during 2015-16.

Panel Exhibition on Astronomy (Hindi)

Astronomy has always captivated the interest of children and adults alike. The Centre's events on Astronomy receive good participation and there is always demand for more. To satisfy the curiosity of people regarding astronomical phenomena, an informative and attractive panel exhibition based on

Astronomy was developed. The content was developed in Hindi to reach out at national level. The exhibition consisted of five panels based on various astronomical facts, phenomena and events. The topics covered were Stellar Evolution, Seven Wonders of the Universe, Celestial Sphere, Telescope and Eclipse. The panel exhibition was easy to put up in a school set up, be it classroom, lab or at events.



Hindi Manual for Maths Lab Primary Package

Maths Lab Primary Package, consisting select models for setting up Maths Lab at primary school level, was introduced by VASCSC in 2010. The package contains models comprising teaching aids and puzzles and user manual. The Package received a good response from schools across the country. The user manuals were available only in English and Gujarati. Keeping this in mind, the User Manual was developed in Hindi to cater to the growing demand from Hindi users. The manual provides detailed description of the models provided in the package and how to use them.



Other Programmes

Radio Programme

A 26 episode radio series in Gujarati titled *Parmanu Yatra* was developed to commemorate Hundred Years of Atom with the support of NCSTC, DST, Govt. of India; All India Radio and Vigyan Prasar. This programme which commenced in the previous year on 17 November 2014, concluded on 18 May 2015. It was broadcast from Akashvani's Ahmedabad, Vadodara, Rajkot, Bhuj and Godhra stations every Monday during 9:30-10:00 pm (MW 846 KHz). The programme aimed to communicate to the general public how our perception of the natural phenomena has changed since the discovery of the atomic structure in 1913, to disseminate scientific information related to atomic structure and phenomena, along with advances in related technologies. At the end of each episode, a question was posed to the listeners. The best answers were awarded free subscription of Vigyan Drashti.

Geometry Club

The activity of Geometry Club at VASCSC, started by Prof. A. R. Rao, about fifteen years back has continued uninterruptedly even after his passing away in 2011, thanks to the enthusiasm and interest of the club members. Dedicated geometry enthusiasts meet every Saturday, all the year round,

at VASCSC, to discuss interesting geometrical results and to solve challenging problems. The group comprises of people from fields as diverse as teaching, banking, engineering and medicine.

Library Programme

The Centre's library houses a collection of Science and Mathematics reference books. These books include those for children as well as advanced reference material for high school and college students, who have been using this facility regularly. The library is continuously upgraded with new collection and reference material for its young readers. It has been an effective resource for educators to update themselves.

Science Shop

The Centre's staff is continuously engaged in development of new and innovative Science and Mathematics TLM. This material includes publications, kits and models. The Centre's Science Shop is associated with making available this material to the general public. An attractive brochure-cum-price list was brought for wider publicity. The material available through Science Shop is popular among student and teachers and received demand from schools across the country.

We are thankful to the following agencies who have been our major funding and project partners for the year 2015-16:

- Department of Science & Technology (DST), NCSTC, Govt. of India, New Delhi
- Department of Biotechnology (DBT), Govt. of India, New Delhi
- National Council of Science Museums, Kolkata
- IBM India Pvt. Ltd.
- Dr. Sureshbhai D. Bhatt Charitable Trust
- American India Foundation Trust
- Cairn Energy India Ltd.
- KHS Machinery Pvt. Ltd
- GCERT, Gandhinagar
- Vigyan Prasar, New Delhi

VASCSC has been collaborating and networking with several institutions and organizations. The following is a list of such institutions for 2015-16:

- Ahmedabad Education Society
- All India Radio
- Alwar Mewat Institute for Education & Development
- Army Public School, Jodhpur
- Centre for Environment Education (CEE)
- DIETs, Gujarat
- GUJCOST, Gandhinagar
- Gujarat Ganit Mandal
- Gujarat Science Academy (GSA)
- Gujarat Science City
- Indian Association of Physics Teachers (IAPT)
- Institute for Plasma Research (IPR)
- Indian Railways
- ICICI Foundation for Inclusive Growth, Raipur
- IIT Gandhinagar
- MoEFCC, Govt. of India
- Nehru Foundation for Development
- Paryavaran Edutech, Ahmedabad
- Physical Research Laboratory (PRL)
- Plan India
- Serenity Library, Ahmedabad
- St. Xavier's College, Ahmedabad
- VIKSAT, Ahmedabad
- V. S. Patel College of Arts and Science
- Yuva Unstoppable

Our Bankers

- Bank of India
- HDFC Bank
- ICICI Bank
- State Bank of India

The Centre's team members participated in the following during 2015-16:

- The Rashtriya Avishkar Abhiyan (RAA) was launched at the hands of Dr. A. P. J. Abdul Kalam on 9 July 2015 at New Delhi. The RAA is a concept of MHRD, Gol aimed to inculcate spirit of inquiry and creativity in children. Shri Dilip Surkar attended the launch of the mission. VASCSC has been identified by MHRD as one of the national level nodal institutions for implementing the mission.

- Shri Prakash Javadekar, Hon'ble Minister, MoEFCC, Gol visited CEE Ahmedabad on 9 August 2015 to review the development of SECAS exhibition. Shri Kartikeya Sarabhai, Shri Dilip Surkar and VASCSC & CEE team were present during interaction with him.

- Ms. Apeksha Parikh and Ms. Dhvani Shah attended the review meeting for radio serial 'Atom to star', organized by Vigyan Prasar at Chennai during 22-23 September 2015.

- Ms. Megha Saklani was part of the national level organizing committee for 8th National Teachers Science Congress, a programme of DST, Gol. She participated as Resource Person in the brainstorming workshop at BARC, Mumbai during 4-5 May 2015, regional workshop at RIE, Ajmer during 20-21 July 2015 & main event at IISER, Pune during 17-19 December 2015.

- Shri Arvind Gupta, renowned science popularizer visited the Centre on 3 October 2015. He interacted with VASCSC team and students and demonstrated how simple material can be used to communicate science concepts.

- Ms. Dhvani Shah was judge at 46th district-level Science Fair organized on 28 October 2015.

- Ms. Megha Parikh, Ms. Neelam Mishra and Ms. Sudakshina Sengupta attended a planning meeting to shortlist innovative TLM for Science Activity Centres in 10 schools, at Alwar Mewat Institute for Education and Development during 8-9 December 2015, organized by Plan India and AIMED.

- Ms. Megha Saklani conducted a session on 'Science of Water' in the Water Educators Training (WET 2016) on 24 February 2016. The training was organized by VIKSAT and supported by NCSTC, DST, Gol.

- Shri Dilip Surkar, Executive Director, VASCSC was member of several committees and participated in meetings, discussions, forums and events during the year.

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(As on 31 March 2016)

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Gandhi Heritage Portal
Gandhi Ashram
Ashram Road, Ahmedabad

Member Secretary
Shri Dilip Surkar
Executive Director
Vikram A Sarabhai Community Science Centre,
Navrangpura, Ahmedabad 380 009

Abridged Balance Sheet

(Rupees in Lakh)

Funds and Liabilities	31.03.2015	31.03.2016	Assets	31.03.2015	31.03.2016
Reserves and Surplus	172	188	Movable Properties	70	72
Project Grant Balances	6	187	Investment	80	255
Suppliers and Sundry Creditors	51	50	Cash and Bank account	14	74
			Income Receivable	10	11
			Advances and others	53	10
			Stock of Edu. & Training Material	2	3
Total	229	425	Total	229	425

Abridged Income and Expenditure Account

Income	31.03.2015	in %	31.03.2016	in %
Project Grants (Revenue Recognition)	272	51	336	53
Transfer from Earmarked Funds	30	6	9	1
Revenue from Publication and other Educational Materials	22	4	26	4
Fees for Educational Programmes	66	12	75	12
Recoveries and Interest	146	27	193	30
Total	536	100	639	100

Expenditure				
Staff Salaries	163	31	181	28
Projects and Programmes	303	57	382	60
Establishment and Administration	27	5	56	9
Against Earmarked Funds Expenses	26	4	6	1
Sub Total Recuring Expenditure	519	97	625	98
Reserves and Surplus	14	3	12	2
Sub Total	533	100	637	100
Total Non-Recuring Expenditure	3		2	
Total Expenditure (Recuring + Non Recuring)	536		639	

Funding Sources for Expenses

Details	31.03.2015	in %	31.03.2016	in %
International Sources	23	4	16	2
National Sources	249	46	320	50
Interest & Donation	12	2	10	2
Education Programmes	88	16	101	16
Self Generated Sources	164	32	192	30
Total	536	100	639	100



Note

- Recoveries and interest include user charges, overheads, other miscellaneous income and interest.
- Project Grant income shows revenue recognition.
- Income from earmarked funds have been transferred from the specific fund created for the said purpose.
- The figures are taken from the audited statement of accounts of the respective years.

VASCSC is registered under the Societies Registration Act 1860, Reg. No. GUJ/2425 (Ahmedabad) and registered under the Foreign Contribution (Regulations) Act 1976 with the Ministry of Home Affairs, Govt. of India, New Delhi. (Registration No. 041910288, 29 Nov 2002). Donations to Vikram A Sarabhai Community Science Centre are exempted U/S 80G (5) of the Income Tax Act 1956.

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