



# **Navi Mumbai Science Foundation**

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## **Annual Report for the year 2018-19**

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**Our Website:** <http://www.navimumbaisciencefoundation.org>

## **I. Introduction.**

**Navi Mumbai Science Foundation (NMSF)** is a science led NGO which endeavours to promote development of scientific culture in the society and scientific temperament among students. To achieve this objective, it plans and conducts a multitude of activities in an academic year. These activities are focused on building a problem solving attitude in students while developing their collaborative mind-set. It endeavours to ensure their successful transition from pure academics to facing problems related to societal needs. The following activities conducted during the year under consideration will make this point clear:

**National Children's Science Congress (NCSC) activity**, in particular, engages a large number of students and exposes them to basics of research and the essentials of collaborative work culture. **For Homi Bhabha Bal Vaidnyanik Competition [HBBVC] and Regional Maths Olympiad examination**, NMSF conducts interactive sessions for science and maths. **This programme provides a platform for interaction between students and creative personalities.**

**The two day Science Utsav** program organizes **Teachers' Conference** on day one and **student's exhibition on science experiments** on day two. Teachers' conference (i) provides a prime opportunity to teachers to acquaint themselves first hand with the latest trends in the field of education and (ii) to get to know the mindset of their colleagues as regards strategies of knowledge transmission. **The second day's programme** inspires students to demonstrate their experimental skills and to assess understanding of basic scientific principles.

The objective of **"Science Nurture Club" (for students of Std. VII and VIII)** is to build the interest of students in science through discussions and hands-on activities like experiments and projects while keeping the school syllabus in mind.

**The Essay Competition on the topic "Nurturing Talent for Nobel Laureatism"** has been introduced at school level to enable bright students to opt for careers in basic sciences as well.

**"Fun with Science Activity"** conveys the joy that science education has in store for students.

The **"World Nuclear Energy Day"** celebrates the discovery of nuclear chain reaction and gives a glimpse of Indian nuclear energy programme for societal benefits.

*What follows is a run-up of the year that was, detailing what NMSF is trying to defend and illustrating what it is trying to achieve.*

## **II. Science Nurture Club – 2018-19.**

This program is designed for students of Std. VII and VIII and is organized in association with "Kindle Education Services". The classes, taken in separate batches for VII and VIII standard students, consisted of ~ 25 interactive sessions of 1.5 hours each held on Sundays from July 2018, to Feb 2019. The objective, achieved through discussions and hands-on activities like experiments and projects, was to build interest of students in science and help them become independent learners.

## **III. National Children's Science Congress-2018 (NCSC-2018) activity**

This is a very popular scientific activity among student community of Navi Mumbai. It engages a large number of students and exposes them to basics of research and essentials of collaborative work culture.

### **Guidance Work Shop (GWS) for prospective Teacher Guides of Navi Mumbai:**

Navi Mumbai Science Foundation, organized a half-day workshop at Sainath Hindi High School and Junior College, Vashi (in association with the school) on July 17, 2018, with focal theme as "Science, Technology and Innovation for a Clean, Green & Healthy Nation" and Sub themes were: (i) Ecosystem and Ecosystem Services (ii) Health, Hygiene and Sanitation (iii) Waste to Wealth (iv) Society, Culture and Livelihoods and (v) Traditional Knowledge System.

Nearly 20 teachers from various schools participated. Dr. A. M. Bhagwat, Chairman, NMSF, briefly described the activities of NMSF and NCSC activity in particular; with respect to format of project preparation and its salient features. Shri Bellary M. P, Smt. Mamata Aggarwal and Dr. D. A. R. Babu, Members, NMSF, served as invited speakers for this event.

### **NCSC-2018 projects screening and oral presentation by the students:**

A total 87 projects were registered; first level of screening of these projects was done on 29 and 30 September, 2018, and 52 projects were selected for oral presentation. The oral presentation of these selected projects was conducted by senior scientists and NMSF members at New Horizon Public School, Airoli, on 13 October, 2018. Six projects from different schools were finally selected for regional level screening. Results of final selected projects are given below.

**The entire activity for the year 2018 may be summed up as under:**

- \*Number of registrations received = 87
- \* Number of Projects received = 87
- \*Number of schools involved = 13
- \*Number of students involved = 387
- \*Screening of Projects: carried out on Sept 29 & 30, 2018.
- \* Number of teams selected for oral presentation = 52
- \*Oral Presentations arranged on: 13. 10. 2018 at New Horizon Public School, Airoli.
- \* Number of teams selected for regional screening = 6
- \* Number of teams selected for state level presentation = 2

#### ***Details of teams that reached up to state level:***

**1. School:** Sadhu Vaswani Int'l School, Sanpada.

**Team Leader:** Sanika Zaware (Team Leader)

**Topic:** Investing antibacterial properties of spices. **Teacher Guide:** Ms Hemna Mehta.

**2. School:** St. Xavier High School, Sec 6, Airoli. **Team Leader:** Ninad Prasant Punyarthi

**Topic:** Food Adulteration. **Teacher Guide:** Mrs Merecy Boomani.

### **IV. Homi Bhabha Bal Vaidnyanik Competition [HBBVC] 2018-19.**



**Theory sessions:** Interactive Guidance Sessions by Scientists and Research Scholars were conducted for students of std. VI at Fr. Agnel Multipurpose school, Sector 9A, Vashi, Navi Mumbai, on Sundays during 9. 00 AM to 12. 30 PM. Students from different schools attended these guidance lectures on Biology, Chemistry and Physics - 15 lectures on each subject and additional 5 lectures on mathematics – all of them by experts in their own field. The lectures were delivered during April 2018 to Aug. 2018. “A total of 42 students of std. VI attended these guidance sessions”. To boost morale of the students and familiarize them with HBBVC examination, two mock tests were also conducted and guidance in answering the question paper and time utilization was provided to the students.

**Practical's Workshops:** To provide hands-on experience to individual students, practicals' workshop was conducted at the above venue on November 25, 2018, and December 9, 2018, for students of standard VI & IX respectively. Total number of students (VI and IX together) who attended the workshops was **48**. Twenty four practicals (8 each in Biology, Chemistry and Physics) were performed by each student.

### **V. Pre-Regional Mathematics Olympiad (Pre-RMO) & RMO Examination of 2018.**

Students who are eligible to appear for this examination are those in standard VIII and IX at present. Guidance lectures for them were started from **Dec. 10, 2017**, (on Saturdays at Fr. Agnel Multipurpose School, Sector 9A, Vashi, Navi Mumbai) and continued till end of **August 2018** . The classes continued further up to **October 2018**, for the benefit of those who got selected for RMO & for others as practice sessions for the next stage, i. e. RMO. Total number of students, who attended the classes was six. The classes were conducted by experienced scientists and university professors.

### **VI. Fun with Science (FWS) Programmes.**



This is a very informative programme conducted by NMSF to promote interest in students to learn science. It is basically conducted for middle school and high school level students using very simple gadgets to explain the principles of physics. Several such programmes have been conducted by NMSF earlier. During the period of this annual report following programmes were conducted (this programme can be arranged on request, at any schools in and around Navi Mumbai):

- 1. FWS at NACIN** (National Academy for Customs, Indirect Taxes & Narcotics), Bhandup (E): A one & a half hour workshop was held at the above venue on May 22, 2018, for a group of ~ 30 students of Std. VI to IX. The students were children of Central Govt. Employees belonging to the above mentioned Departments of GOI. The WS was a part of one week long summer Camp.
- 2. FWS:** A 2-hour programme at Jilha Parishad School, Kharghar Village, for students of Standard VII & VIII (Marathi Medium). Day & Date: Monday, Aug. 6, 2018. **Courtesy:** Mrs. Swati Shirolkar, President, Inner Wheel Club of Navi Mumbai Sunrise (based in Kharghar).
- 3. FWS:** A 2-hour programme at Radcliffe H S, Kharghar, for students of Standard IX (Eng. Medium) during Aug, 2018. **Courtesy:** Mrs. Swati Shirolkar, President, Inner Wheel Club of Navi Mumbai Sunrise (based in Kharghar).



4. **FWS:** A 2-hour programme at Matoshri Vidya Mandir, Gowandi/Deonar, for students of Standard IX (Marathi Medium). Day & Date: Thursday, Jan. 24, 2019. **Courtesy:** Mrs. Rohini Ravindran, Member, Inner Wheel Club of Deonar, Mumbai.

## VII. Special events: World Nuclear Energy Day-2018



Navi Mumbai Science Foundation (NMSF) and Karmaveer Bhaurao Patil College (KBPC), Vashi, in association with Indian Association for Radiation Protection and Maharashtra Academy of Sciences (Mumbai Chapter) organized the "World Nuclear Energy Day" programme on 3rd of Dec. 2018, at KBP College, Vashi, to commemorate the anniversary of criticality attained at the first nuclear reactor constructed by Famous American Scientist Enrico Fermi in the year 1942.

After the inauguration of the programme, **Dr (Smt.) Patil, Vice Principal, KBPC**, gave a brief introductory talk on the event and participation of their college in this function. Dr. D. A. R. Babu, Secretary, NMSF, introduced the chief guest to audience.



### Inauguration of the programme by the chief Guest Dr. S. Kailas

The **chief guest Dr. Swaminathan Kailash**, Former Director, Physics Group, BARC, then delivered the “**Enrico Fermi Memorial lecture**” in which he presented a brief history of formation of different elements since big bang and later by accelerators using light and heavy charged particles. In his presentation '*Journey through wonderful world of elements and isotopes*', he explained the formation of elements from hydrogen to latest invention of heavy element with atomic no. 118. He further explained about recently identified isotopes and their applications in medicine. In his address, he emphasized the need of nuclear power as it is efficient, environment friendly and sustainable, and is best suited energy source for our country's energy requirements. His presentation was well received by the audience.

Shri. Meghraj Singh, Scientific Officer, Atomic Energy Regulatory Board gave very informative presentation on 'Industrial Uses of Radio-isotopes'. He started his presentation with the characteristic properties of ionizing radiations, properties of radiation suitable for various industrial applications and radio-isotopes used in industry. Some of the applications he explained were sterilization of medical products, radiation dose to agricultural products for inhibiting sprouting, disinfection of agriculture products, mutation etc., He also explained the advantages of nuclear techniques over conventional methods. He briefly highlighted the uses of radio-isotopes in industrial radiography and showed various variety of radiography devices used for this purpose. The role of Atomic Energy Regulatory Board in implementing radiation safety in nuclear industry was highlighted.



**Presentation by Shri Meghraj Singh**

**Dr. D. A. R. Babu**, Former Head, Radiological Physics and Advisory Division, BARC, gave a brief overview of radiation safety and regulatory aspects adopted in Nuclear Industry. He emphasized the need of safety at all stages in nuclear fuel cycle. He advocated the use of **ALARA** (As Low As Reasonably Achievable) principle in radiation protection. He explained the need of various radiation monitoring methods like personal, area, environment, etc.



**Participants of the programme**



The event concluded with a vote of thanks to all the dignitaries by Head of Chemistry Department Dr Y. S. Gaikwad.

As a part of "World Nuclear Energy Day" celebrations, two events were also organized for students of Junior College & Degree College; i) a MCQ test for students of Jr. College and ii) an essay competition on the topic "Medical Applications of Radioisotopes" for students of both Jr. & Degree Colleges under KBP college. They were an added attraction to the day's programme which were widely welcomed. The winners in each category were suitably rewarded.

Sr.No.	Name of the Student	Position
1.	Simran Kelkar	First
2.	Sanjeev Ineepatare	Second
3.	Suman Bachate	Third

### VIII. Essay Competition on the topic "Nurturing Talent for Nobel Laureatist-2018"

This event is a first of its kind initiated by NMSF during the previous year. It was organized in association with Reliance Foundation School, Koparkhairne. Participation in it was restricted to students of Std. IX & X.



NMSF felt that there is a need to promote basic sciences at school level by encouraging bright students to opt for science subjects as well rather than getting attracted only towards lucrative branches of engineering & technology which offer an excellent pay package and hence a rich material life style from day one of their career. It was also emphasized that a career in basic sciences offers more satisfaction in the long run.

The competition was thus aimed at drawing the attention of the young minds to the fact that there has been a dearth of Nobel Prizes in the country. It was also to remind the younger generation that India too had a rich past in scientific achievements in the fields like Mathematics, Astronomy, Medicine & Metallurgy which covered India with glory for more than two millennia before the 12<sup>th</sup> century AD. Revival of the past glory should not, therefore, prove to be an insurmountable challenge.

With this aim in mind, NMSF conducted the essay competition for Navi Mumbai school children at Reliance Foundation School on Friday, 27<sup>th</sup> July, 2018 (written test) and Saturday, 24<sup>th</sup> November, 2018 (oral + ppt presentation followed by an interview) for all the three branches i. e., Physics, Chemistry and Biology (Physiology or Medicine). Following are results based on the overall performance of students:

S. No.	Name of Student	School	Stream	Position
1.	Ashutosh Kashyap	Bal Bharti public school, Kharghar	Physics	1
2.	Dheeraj Anna	DAV Int'l School, Kharghar	Physics	2
3.	Alphonz George	Don Bosco Sr. Secondary Sch, Nerul	Physics	3
4.	Srijita singh	DAV Int'l School, Kharghar	Chemistry	1
5.	Sukriti Choudhari	St. Mary's ICSE School, K K	Chemistry	2
6.	Aditya Jindal	Reliance Foundation School,K K	Chemistry	3
7.	Abigail Thomas	New Horizon Scholar's School, Airoli	Biology (Phyiology/Medicine)	1
8.	Paridhi Maheshwari	Reliance Foundation School,K K	---"---	2
9.	Dawoo Maheshwari	St. Mary's ICSE School, K K	---"---	3

***Overall topper "Sir C. V. Raman Award" went to Bal Bharti public school, Kharghar.***

***The response to the event was encouraging enough to ensure its continuity in the following years.***



Chief Guest Shri Suhas Naik-Satam being honoured by Principal Shri Alok Katdare of Reliance Foundation School



Students writing the essay



A student facing the interview.

## IX. Signature Event of NMSF: Science Utsav-2019.



**Science Utsav–2019** was organized on 12-13 January, 2019, at Gujarat Samaj Bhavan, Sector 15, Vashi, in association with Shree Gujarati Samaj, Vashi, and Maharashtra Academy of Sciences (Mumbai Chapter).

**Day 1 (12-01-2019): Teachers' Conference(TC-2019)** was organized under the able guidance of Homi Bhabha Centre for Science Education (HBCSE, TIFR), Mankhurd, Mumbai. The main theme for the present Teachers' Conference "Subject and Pedagogical Content Knowledge in Science Teaching".



**Dr. Bhagwat, Chairman NMSF, making the introductory remarks.**



**Chief Guest Dr. Nicholas Correa, Principal, New Horizon Public School, presenting the inaugural address.**



**Presentation by Invited speaker**



**Presentation by a teacher**



Pedagogy is a term that is used in education as a synonym for teaching or a “bag of teaching tricks”. It has more to do with understanding the relationship between teaching and learning in ways that foster student’s development and growth. Lee Shulman, an American educational psychologist and researcher, noticed that all learners need a teacher who is more than just knowledgeable about their subjects. Learners also need one who can teach their specific subjects clearly and effectively. He called this combination of content and teaching knowledge or the integration of subject expertise and skilled teaching of that particular subject as Pedagogical Content Knowledge (PCK).

He further describes PCK as, *the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction.* According to Shulman, *content knowledge is the teacher’s knowledge about the subject matter which includes knowledge of concepts, theories, ideas, organizational framework, and evidence and proof, as well as the practices and approaches that lead to developing such knowledge.* He defined pedagogical knowledge as the teacher’s deep understanding of the processes and practices or method of teaching and learning. Pedagogical knowledge includes: understanding the nature of the learners, having strategies for evaluating the learners, and understanding the cognitive, social and developmental theories of learning and how these apply to learners in classroom.

Innovative methods in teaching methodology is an essential component in teaching at all levels. The main mandate of this conference was to pool the innovative ideas arising from practising teachers under single platform. In this process, many teachers can learn new ideas/practices of teaching and can discuss their problems in open forum. NMSF has achieved their goal by gathering nearly 40 teachers from Navi Mumbai Municipal Corporation (NMMC) schools and other English medium schools in and around Navi Mumbai.

**The conference was inaugurated by** Dr. Nicholas Correa, Director, New Horizon Public School followed by Invited talks by

Dr. Narendra Deshmukh, HBCSE (TIFR)

Dr. Prof. Sunita Wadikar, Principal, Pillai College of Education and Research

Dr. Reema Mani, HBCSE (TIFR)

Dr. Meena Sharma, K J Somaiya College of Science&Commerce, Vidyavihar, Mumbai

The invited presentations were well received by all participating teachers. For the benefit of Marathi medium teachers' explanation was also given in local language.

Participating teachers also made oral presentations based on sub-themes as mentioned below:

1. Understanding our learners
2. Learning Environment in the Classroom
3. Role of Subject Matter Knowledge in teaching science
4. Teaching Strategies for Science

The programme concluded with feedback from the participating teachers and distribution of participation certificates.

***Proceedings of the conference were also brought out for the benefit of teaching community. They will also be published on the NMSF website: [www.navimumbaisciencefoundation.org](http://www.navimumbaisciencefoundation.org)***



**Day 2 (13-01-2019):** To inspire students to demonstrate their experimental skills and to assess their understanding of basic scientific principles, second day was exclusively dedicated to demonstration of science experiments by students at the same venue. This event was inaugurated by Shri. BSVG Sarma former Head, Technology Transfer and Coordination Division, Bhabha Atomic Research Centre, Trombay, Mumbai-85.



**Students' participation in  
Exhibition of Science Experiments**



**Students' participation in  
Exhibition of Science Experiments**

Following demonstration stalls were also set up during the event by several voluntary organizations-Their utility could be judged by their crowd-pulling ability:

1. Homi Bhabha Centre for Science Education (HBCSE, TIFR)
2. Science through toys by Prof. R. D. Kavathekar
3. Origami-Thane
4. Nehru Science Centre, Worli,

**Prizes** for the winners of science experiments were distributed at the end of the programme.

## **X. National Science Day (February 28. 2019)**

**FWS at MGM's College of Engineering, Kamothe** (As part of National Science Day celebrations): At the request of the Dean (First Year Engg): FWS programme was conducted on March 1, 2019, for a select group of ~ 50 students of 1<sup>st</sup> year Engineering Course. Amazingly, the event was well received by all the students & the teaching staff present. A good number of students participated in the discussions that followed the experiments.

## **XI. Judging:**

**1. St. Mary's Multipurpose High School & Jr. College, Vashi, Navi Mumbai** conducted ENIGMA 18 on 01-12-2018. The themes for Junior and Senior category are 'My School - A Green School' and 'Robotics in improving the quality of life' respectively. Two of our NMSF members (i) Dr S T Mehetre (ii) Dr D A R Babu served as judges for this event for Junior and Senior categories respectively.

**2. Garodia International Centre of Learning, Ghatkopar, Mumbai** in association with Members of International Schools' Association (MISA) has conducted Science Synergy exhibition with main theme "Technology the Game Changer in 2018-19". Three of NMSF (i) Dr A M Bhagwat (ii) Dr D A R Babu (iii) Dr S T Mehetre served as judges for Junior and Senior categories of this event on 19-01-2019.

**3. Podar International School, Nerul** has conducted annual science exhibition on 23-02-2019 with main focus on 'To maintain sustainable environment'. Three of NMSF members (i) Dr D A R Babu (ii) Shri. M. P. Bellary (iii) Dr S T Mehetre served as judges for this event.

## **XII. Miscellaneous Activities.**

**1. INSPIRE Camp** (Nov. 26-30, 2018) jointly organized by Karmaveer Bhaurao Patil College (KBPC) and Navi Mumbai Science Foundation (NMSF) at the college premises, Vashi, N M. Nov. 26 – 30, 2018. **Dr. A. M. Bhagwat, was invited as the chief Guest** at the inaugural function. Talks delivered by NMSF members:

### **Talks delivered by resource persons from NMSF**

<b>S. No.</b>	<b>Speaker</b>	<b>Date</b>	<b>Topic</b>
1	Dr. K. P. Muthe	26. 11. 2018	From quarks to galaxies
2	Dr. K. P. Muthe	27. 11. 2018	Applications of radio-isotopes
3	Dr. Anand Maind	29. 11. 2018	Project selection in chemistry
4	Dr. Shovit Bhattacharya	29. 11. 2018	Nanotechnology and their applications.
5	Ms. Pratiksha Pandav	28. 11. 2018	Robotics
6	Ms. Pratiksha Pandav	30. 11. 2018	Artificial Intelligence

**2. Rayat Shikshan Sanstha's Tri-annual "Vidnyan Parishad"**, at Karmaveer Bhaurao Patil College (KBPC), Vashi (Dec. 29 – 31, 2018).

#### **Speakers:**

K. P. Muthe: Science through stories

A. M. Bhagwat: A mindset for innovations for sustainable development.

### **Felicitation**

During Republic Day celebrations of **"Vasudhaiva Kutukbakam"** organized by Shri Prabhakaran of "In Major City" on 26-01-2019, members of Navi Mumbai Science Foundation were felicitated at Institute of Technology and Management, Kharghar, Navi Mumbai.

## **XIII. Introduction of a new activity.**

NMSF members were deliberating for quite some time over starting a scientific E-Magazine for the benefit of students mainly belonging to age group of Std. VI to X. The efforts made in this direction have borne fruit and its first issue – a quarterly - under the name **"EduREKA"** for the period April-June 2019 is ready for release soon.

#### **XIV. Administrative Matters.**

During the period of this report, 43 weekly meetings were held where all the scientific activities of NMSF were taken up and discussed before & during their implementation. The meeting dated February 25, 2019, was planned as 7th “Annual General Body Meeting” and conducted accordingly (those present at the meeting were: Dr. A. M. Bhagwat, Dr. A. K. Rajarajan, Dr. D. A. R. Babu, Shri M. P. Bellary, Dr. K. P. Muthe and Dr. S. T. Mehetre).

#### **XV. Acknowledgements:**

Navi Mumbai Science Foundation feels profoundly grateful while acknowledging the whole hearted support it continues to receive from various agencies and organizations, without whom the above referred activities / events would not have materialized.

**The list of such organizations is as follows:**

- 1) Shree Gujarati Samaj, especially their office-bearers and Manager, Gujarati Samaj Bhavan.
- 2) Maharashtra Academy of Sciences (Mumbai Chapter).
- 3) Karmaveer Bhaurao Patil (KBP) College, Vashi, its Management, Principal and Staff.
- 4) Fr. Agnel Multi Purpose School, Vashi, its Management, Principal and Staff.
- 5) New Horizon Public School & Penguin Kids, Airoli, its Management, Principal and Staff.
- 6) Reliance Foundation School, KK, its Management, Principal and Staff.

**It may also be noted that the list of supporters for our activities / events is growing gradually and this point is more important for the future of the organization.**

**The financial support from the following organizations is gratefully acknowledged:**

- 1) Indian Association for Radiation Protection.
- 2) Thane Janata Sahakari Bank Ltd.
- 3) Maharashtra Academy of Sciences (Mumbai Chapter).
- 4) Andhra Bank, Vashi.

**Our Website: <http://www.navimumbaisciencefoundation.org>**

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