Navi Mumbai Science Foundation

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Annual Report for the year 2021-22.

Contents

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 the student community in particular. To achieve this objective, NMSF plans and conducts a multitude of activities in each academic year. They have been grouped as "Extra-Curricular Scientific Activities (ECSA)" and mainly involve students of the **age group of 10-20 years, which are the most formative years in the life of any individual.** This in turn contributes towards a holistic development of the nation and prepares it to face the challenges posed by a technologically advancing global environment without losing sight of its societal commitments.

These activities are focused on building a problem-solving attitude in students while developing their collaborative mindset. It endeavours to ensure their successful transition from pure academics to facing problems related to societal needs.

This year too, like last year, NMSF's activities could not be conducted in normal physical mode due to prevailing CORONA PANDEMIC conditions. Perforce, all the activities were planned in ONLINE MODE. Though they posed challenges, last year's experience of work under similar conditions, made the job relatively easy. Most of the activities could be planned adequately well and were carried out to the satisfaction of all concerned. A few of the activities had to be dropped because of varying reasons.

The overall annual performance was therefore found to be quite satisfactory. With the CORONA PANDEMIC wave having declined significantly by now and normal schooling has been resumed. It augers well for our scientific activities too in the coming academic year.

II. HOMI BHABHA BAL VAIDNYANIK COMPETITION [HBBVC] 2021-22.

(Interactive Guidance Sessions by Scientists & Research Scholars)

Navi Mumbai Science Foundation has been conducting offline guidance sessions for Homi Bhabha Bal Vaidnyanik Competition (HBBVC) in theory and practicals for the past few years, for students of Std. VI, at Fr. Agnel Multipurpose School, Sector 9A, Vashi, Navi Mumbai.

The theory portion consists of 50 lectures spread over 15 sessions (on Sundays only). Students from different schools attend these guidance sessions consisting of 15 lectures each on Biology, Chemistry and Physics and additional 5 lectures on mathematics. The faculty for these lectures consists of experienced scientists. Due to prevailing COVOD-19 scenario in the current year, all the sessions were conducted in

ONLINE MODE via the Zoom platform. However, the format remained the same as adopted in the previous offline mode.

To give a feel of this kind of exposure to students, one free online lecture was arranged on Sunday, the 30th May, 2021. The regular online classes started from Sunday, June 06, 2021, and continued till end of September, 2021, with a vacation in the month of May. The timings of classes were from 9:00 AM to 12:30 PM. Twenty-one students, from various schools of Navi Mumbai, & Anushaktinagar attended the classes. After completion of the scheduled sessions, two online practice tests, similar to actual HBBVC test, were also conducted. **Further details regarding these guidance sessions are given in the following sheet.**

Practicals' Workshops: Since all the schools had started functioning in the normal mode by the end of the year 2021, a one-day full-fledged practicals workshop was arranged at the Fr. Agnel M. P. School, on Jan. 9, 2022. It drew an excellent response. In all, fifty-three students attended the workshop.

III. DR. VIKRAM SARABHAI ESSAY-CUM-ELOCUTION COMPETITION-2021 ON "SPACE EXPLORATION"

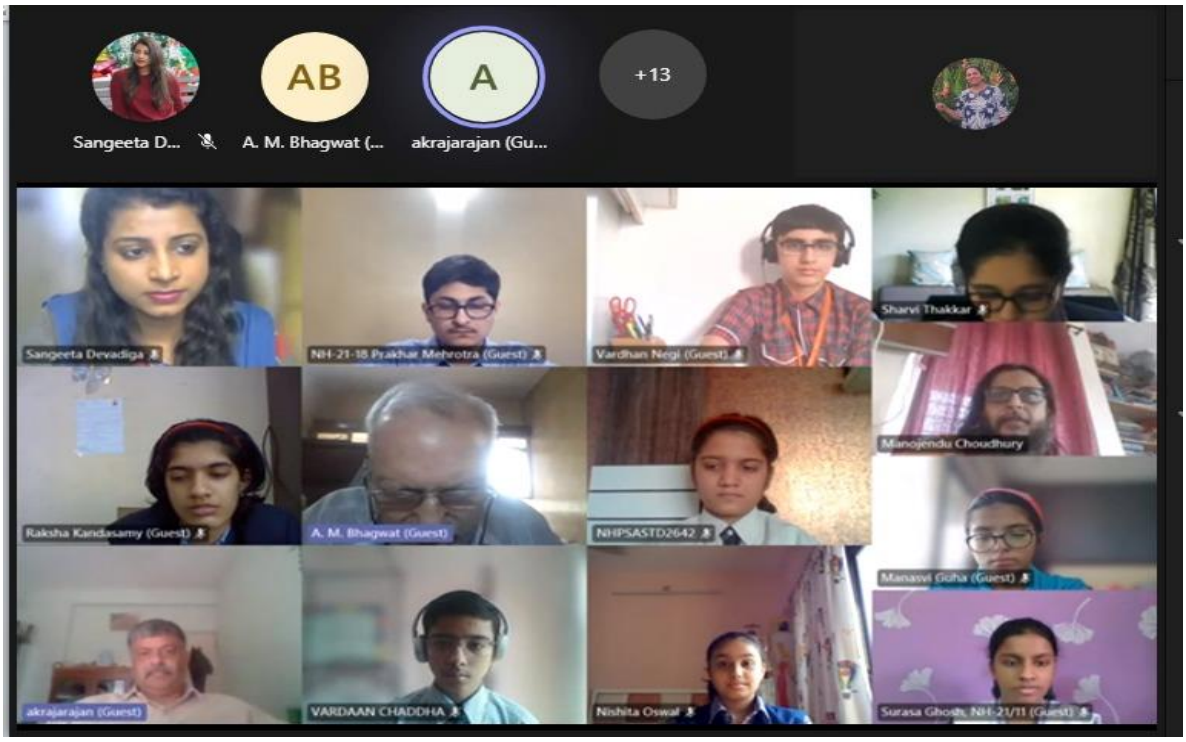
It is a new activity which was added to the list of scientific activities of NMSF this year. It helped in further diversification of scientific areas being explored by NMSF. This Inter School essay competition was started during this year in association with "New Horizon Public School (NHPS), Airoli, & was titled as "**Dr. Vikram Sarabhai Essay-cum-Elocution Competition (VSE-EC)".** Initiating it in the year 2020 had a natural benefit of its coinciding with the 100th birth anniversary of our great space scientist, late Dr. Vikram Sarabhai**.** Further, this activity was the **"First of its kind"** in Navi Mumbai.

The intention behind starting this activity was to preserve & nurture natural curiosity of children about anything relating to open skies. Exposing children to space sciences, thus became one of the focal points of Navi Mumbai Science Foundation (NMSF). This essay competition was its natural consequence. It was also decided to organize this event annually under the overall head of **"SPACE EXPLORATION",** the actual essay topic being decided each year. The topic for the year 2021 was thus chosen as **"Recycling Technologies – A Must for Survival in Space".**

This being the year of "CORONA PANDEMIC", the event was conducted in online mode & had limited participation too – in all 22. It was organized in two rounds: first, the written part & second, the oral presentation followed by interview of the top 10 students from the first round. The respective dates for the two rounds were 20th November 2021, & Sat. 12th Feb. 2022. The following were the results of the competition:

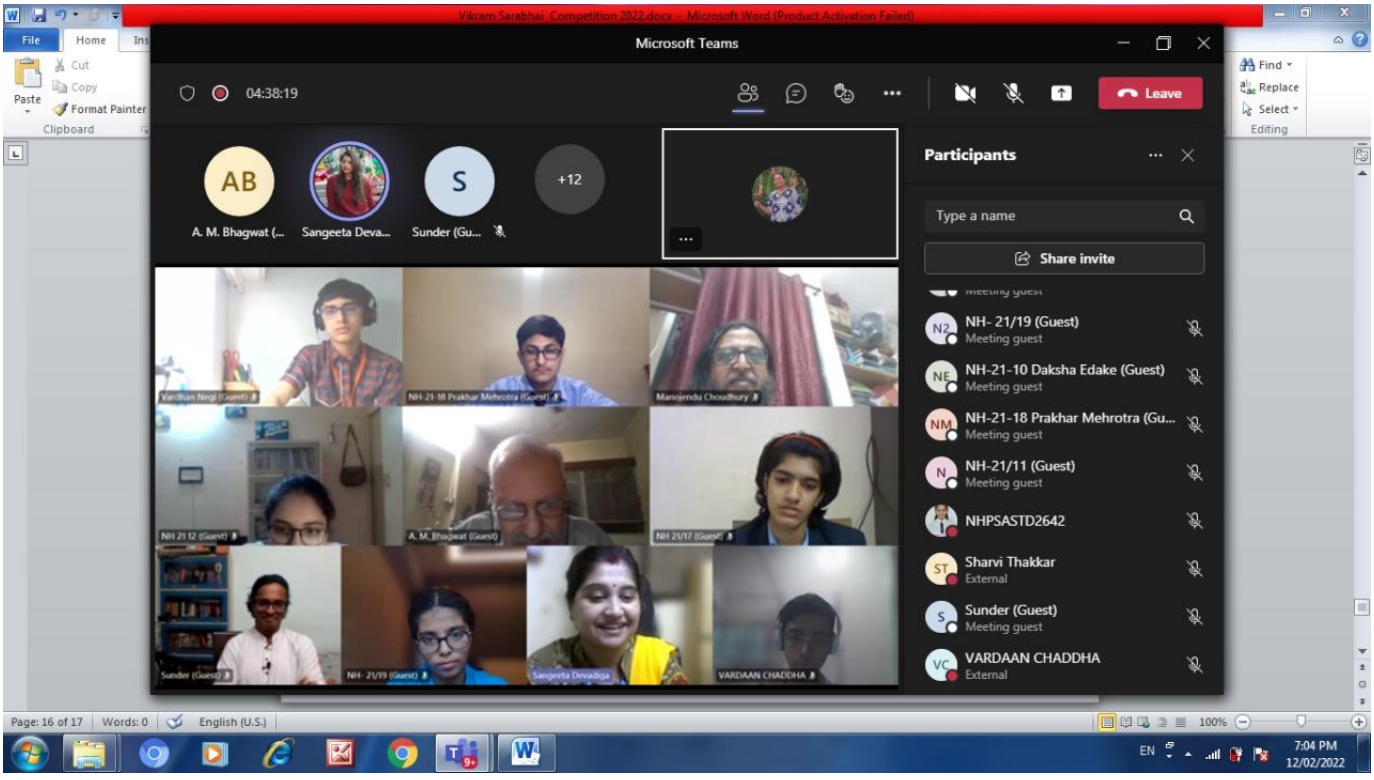
Name of Student	School	Rank
Ms. Raksha Kandaswamy	**Podar International School, CBSE, Nerul**	**I**
Ms. Surasa Ghosh	**Atomic Energy Central School-2, Mumbai**	**II**
Mst. Vardhan Negi	**DAV Public School, Thane**	**III**
Prakhar Meherotra	**Podar International School, CBSE, Nerul**	**III**

THE OVERALL BEST SCHOOL TROPHY WAS WON BY PODAR INTERNATIONAL SCHOOL CBSE, NERUL.



VSEEC-2021

Two photos of a few participating students of the second round with organizers & Judges.



The judges who evaluated the essays scientifically were as under:

1. Dr. Manojendu Choudhury: is presently, a faculty member at Mumbai University. **Formerly,** an Academic Coordinator at Inter University Centre for Astronomy and Astrophysics (IUCAA), Pune.

2. Dr. Sunder Sahayanathan: is presently working as Scientific Officer, at Astrophysical Sciences Division (ApSD), of Bhabha Atomic Research Centre, Mumbai.

Dr. Manojendu

Dr. S. Sahayanathan

Evaluation of the essays from the language point of view was done by teachers:
1) Ms. Chandrani Ghosh, & 2) Ms. Sajitha Prajeesh, of the host (NHPS).

IV. SPECIAL EVENT: WORLD NUCLEAR ENERGY DAY-2021 (WNED-2021).

World Nuclear Energy Day (WNED) is one of the most important events organized offline jointly by Navi Mumbai Science Foundation (NMSF) and Karmaveer Bhaurao Patil College (KBPC), Vashi, on 2nd December each year at the college premises.

This event is conducted to commemorate the anniversary of criticality achieved at the first reactor constructed by Famous American Scientist Enrico Fermi the same day in 1942. Due to prevailing CARONA pandemic, this year too, WNED event was conducted **ONLINE**. Accordingly, all the lectures were delivered online on Zoom platform operated from KBPC premises.

The programme started with a few Introductory Remarks by Principal-in-Charge, Madam Dr. Shubhada Nayak, KBP College. Dr. A. M. Bhagwat, Chairman, NMSF, highlighted the growing relationship between the College & NMSF & gave its credit to forward looking attitude of the present & earlier principals. He also emphasized the fact that we are now consuming "ENERGY" every moment of our lives and it is necessary for us to know if this enhanced requirement is being met by climate friendly sources of energy. In the light of this awareness, the present lecture series is nothing less than a boon for the already enlightened humanity.

The highlight of the event was 'Enrico Fermi memorial lecture' which is delivered by the Chief Guest. Keeping in mind that, of late, the world's energy scenario is evolving rapidly, NMSF decided last year to expand the scope of the Enrico Fermi Memorial Lecture beyond nuclear energy and include new sources of energy which appear to be promising in the near future. As Hydrogen energy is one of the alternatives, it was decided to look for an appropriate alternative to cover this topic. NMSF is grateful to Dr. B. N. Jagatap, former Director Chemistry Group, BARC, and presently with Department of Physics, IIT, Bombay for suggesting the name of Dr. D. Parvatalu.

Dr. D. Parvatalu is working as a **Domain Expert in Hydrogen Programme of ONGC Energy Centre** after superannuating from ONGC in 2016. Earlier he worked as a Project Manager- Hydrogen project team. He gave an overview of the subject matter while highlighting clearly his own contribution to the field.

Dr. D. Parvatalu

The recent trend in energy developments indicate that the world is fast moving towards the imminent major energy transition expectedly by middle of the century by embracing clean & green energy options in view of depletion of the fossil fuel resources coupled with a serious concern on rising CO_2 emissions in the atmosphere from overexploitation of fossil fuels. While renewable energy sources like solar, nuclear, wind, geothermal, ocean, tidal etc. offer clean and green solutions to control carbon emissions, their inherent limitations of time dependence and location centric nature has forced mankind to explore other options. This has paved the way to hydrogen as a proven zero-carbon energy source.

It has resulted in conceptualization of hydrogen economy involving its production, storage, transportation and dispensation to meet various end user needs. Hydrogen has many tasks to perform in meeting energy needs of the present and the future. Among many, valorization (the act of making something valuable or useful from an existing substance) of CO_2 to useful chemicals, potable water is an immediate important task to be performed by hydrogen. During the transitional period. efforts will be needed to adopt to zero-carbon hydrogen world in terms of acceptance, availability and affordability.

Hydrogen is a known energy carrier and thus it has to be produced using a totally renewable energy source in the near future. **Depending on the source / method of production, hydrogen changes colours from grey to green through blue, brown, pink, red etc.** At present 97% hydrogen is grey, made from fossil fuels, and is used mostly for captive purposes at refineries, fertilizer industries etc.; the remaining 3% is by electrolysis for specific end user applications and /or as a by-product at chloralkali industries.

Electrolytic hydrogen is expensive and all efforts are being focused on reducing renewable electricity costs besides improving the process with affordable materials. Although production of green hydrogen using water is energy intensive and costly option at present, very recent developments in renewable energy sources viz., Solar, Wind, Geothermal, Tidal, Bio-energy, Nuclear etc., are paving the way for stable, affordable and easily available green hydrogen energy in large quantities in the near future.

Several green hydrogen generation processes, including highly efficient thermochemical water splitting processes, are still at RD&D stage that are going to see the light sooner or later after

ascertaining affordable materials. Thus, the theme of the future green technologies is water centric, backed by renewables in which solar and nuclear are going to play a lead role. In addition to production, parallel action is in full swing to address the issues of storage, transportation and applications to ensure its optimal utilization. All this will lead to hydrogen economy becoming realizable sooner.

The present talk thus gave an over view of development of multi coloured hydrogen technologies in India in relation with contemporary global scenario.

An "online" essay competition was also organized for UG level college students to encourage their involvement.

Three topics were given. Students could choose any one of them. Five prizes were given based on the overall quality of the essay. They are listed below:

Rank	Essay Topic	Name of the winner	Affiliation
I	Hydrogen – A promising energy source for the future	Rutuja Tarange	Karmaveer Bhaurao Patil College, Vashi, NM.
II	Hydrogen – A promising energy source for the future	Upadhyay Aachal	Karmaveer Bhaurao Patil College, Vashi, NM.
III	The future scenario of energy	Siddhi Sandip Salunkhe	Dr. Patangrao Kadam Mahavidyalaya, Sangli.
IV	Hydrogen – A promising energy source for the future	Sakshi Gholap	Karmaveer Bhaurao Patil College, Vashi, NM.
V	The future scenario of energy	Nisha Donde	Karmaveer Bhaurao Patil College, Vashi, NM.
Note: No essays were received on the third topic which was: **"Understanding the impact of our energy choices"**			

The role of Department of Chemistry, Rayat Shikshan Sanstha's Karmaveer Bhaurao Patil College Vashi, Navi Mumbai, was commendable in organizing this programme. Prize were also given on the same day. The programme ended after the day's activities were summed up by Dr. G. C. Wadhava who also presented a vote of thanks.

V. NATIONAL MATHEMATICS DAY-2021.

The National Mathematics Day - 2021 was celebrated in the online mode (Google meet platform) jointly by the Dept of Mathematics, Rayat Shikshan Sanstha's Karmaveer Bhaurao Patil College, Vashi, NM, and Navi Mumbai Science Foundation (NMSF), on Dec. 21 & 22, 2021**,** under the general title **"Mathematics in Perspective".**

National Mathematics Day is celebrated in India on December 22, every year as it coincides with the date of birth of **Srinivasa Ramanujan Iyengar** - India's & world's greatest mathematicians of modern times. He was born on this day in the year 1887.

The programme started with a few Introductory Remarks by Principal-in-Charge, Madam Dr. Shubhada Nayak, KBP College. Dr. G. A. Dhanorkar, HOD Mathematics, KBP College, briefly described the various activities planned this year as part of this event. He also highlighted the ever-growing role of mathematics in the life of common man. Dr. A. M. Bhagwat, Chairman, NMSF, highlighted the growing relationship between the College & NMSF & gave its credit to ever widening educational perspective of the present & earlier principals. He also highlighted the importance in the rapidly changing technological background of the world.

Day one saw the following activities:

The chief guest, Ms. Pratiksha Sahasrabuddhe, Research Fellow, IIT, Bombay, delivered a talk for High School students on the topic **"Why Mathematics".** The talk was loaded with simplicity and was well received. **It was followed by a "QUIZ" under the title "Ignite your Minds".** It was conducted at three levels, i. e.

Group I: Standard - 8th, 9th & 10^{th}.

Group II: Standard - 11th & 12^{th}.

Group III: Undergraduate & Postgraduate students.

All the students received participation certificate while the top 3 students in each category received certificate of honour & cash prizes. The cash prizes were awarded **in memory of Late Mathematician, Mr. Arjun Dadarao Devane.**

Ignite Your Mind – Quiz Competition Results

GROUP I – Classes 8^{th}, 9^{th} & 10^{th}

S. No.	Name of the Participant	Name of the School	Class	Rank
1	Kunal Chandola	Reliance Foundation School, Koparkhairane	**10^{th}**	**I**
2	Ziyan Mithani	Goldcrest High School, Vashi	**8^{th}**	**II**
3	Aniket Sarkar	Vidya Pratishthan's English Medium School (C.B.S.E) Vidyanagari, Baramati	**8^{th}**	**III**

GROUP II – Classes FYJC & SYJC

S. No.	Name of the Participant	Name of the School/ College	Class	Rank
1	Jatin Ajay Bhoir	Karmaveer Bhaurao Patil College, Vashi	**SYJC**	**I**
2	Jahnavi Gupta	Reliance Foundation School, KK	**FYJC**	**II**
3	Rushikesh Anand Sude	Goldcrest High School, Vashi	**SYJC**	**III**

GROUP III – Classes UG/PG

S.No.	Name of the Participant	Name of the School/ College	Class	Rank
1	Raheen Shamshuddin Shaikh	Karamaveer Bhaurao Patil College, Vashi	**SY Master**	**I**
2	Meet Kunwar	Sinhgad College of Science	**TY Bachelor**	**II**

<u>On Day two,</u> we had a talk by the chief guest Prof. A. Sankaranarayanan, from School of Mathematics and Statistics, University of Hyderabad on

"Some Results of Srinivasa Ramanujan"

A. Sankaranarayanan

In his scintillating talk, he touched upon the following topics: 1. Ramanujan Summation, 2. Infinite Square Root, 3. Magic Square, 4. Strand Puzzle, 5. Bertrand's Postulate, 6. Partition Congruence, & 7. Mean Square of the divisor function.
He covered these topics briefly and highlighted their significance in the areas of "Interdisciplinary Mathematics". He made available a copy of his notes for follow up by any one, if needed.

VI: "SCIENCE UTSAV-2022 (TEACHERS' CONFERENCE-2022)"

Science Utsav is normally a two-day event for NMSF. Day one is devoted to "Teachers' Conference" while Day two is devoted to "Exhibition of Videos of Science Experiments" by students. This year the event was organized jointly with "Homi Bhabha Centre for Science Education (HBCSE-TIFR) in **online mode** on 5th and 6th Feb. 2022.

To ensure smooth conduct of the event, a meeting of the concerned individuals was called on Oct. 22, 2021; the main agenda being to constitute two committees – Advisory & Organizing – & fix their responsibilities. Dr. Sugra Chunawala Dean, HBCSE (TIFR) & Dr. A. M. Bhagwat, Chairman, NMSF, were requested to be the chair persons of these committees respectively. Dr. A. K. Rajarajan (Secretary, NMSF) and Dr. Shirish Pathare (Scientific Officer, HBCSE) were nominated as co-conveners of the Advisory committee. Dr. A. K. Rajarajan was also nominated as convenor of the Organizing committee. These committees subsequently met twice to take all the relevant decisions.

The topic for this year's conference was **"Integration of technology in teaching and learning science: Challenges and Benefits of online education".** It was considered appropriate from the teachers' point of view as they could contribute a lot to it from their recent personal experiences of the past two years.

Day – one: Teachers' Conference

Dr. A.M. Bhagwat (Chairman, NMSF) welcomed the participants and gave a brief introduction to Teachers' conference while sharing briefly the decade long history of this series of conferences. He also introduced the chief guest Prof. Arnab Bhattacharya, Director HBCSE, who delivered the Chitra Natarajan Memorial lecture.

After paying tributes to the late Prof. Chitra Natarajan, Prof. Bhattacharya took head on the most severe problem of practical science education with the spirit of home being the best laboratory in the time of pandemic. Home cited innumerable opportunities of science education when one keeps an open mind. Scientific temperament was the motto of his talk which he demonstrated using a few examples. The talk was well received and is available on YouTube. **Its link is "https://youtu.be/ZCvn2BUjNug".**

The above talk was followed by another important contribution from Shri Khurshid sheikh. He is the recipient of President's National Award for teachers and was introduced by Dr. A. K. Rajarajan. Mr. Khurshid talked on "Science Eye" that the young students should develop in order to learn and apply science and imbibe scientific temper. He described various programs that he implemented for students and teachers of his schools which could be easily adapted by many other schools as well.

Two technical sessions were planned during the day, each having two invited talks.

The first session was chaired by Prof Savita Ladage, Dean, HBCSE.
Dr. Shirish Pathare, from HBCSE, talked about modern tools that are available for education. Beginning with a question of how well our laboratory education adapts itself to modern instruments. He described various modern devices that could change the way experiments are being carried out and taught in schools. Devices using hall probe, mobile based signal generators, manometers etc. are not formidably expensive these days. The message he delivered was that "making a high technology education tool is now only an innovation away".

In the following invited talk **Dr. Alok Katdare** along with Dr. Seema Lathkar (Reliance Foundation School, Koparkhairne) spoke about learning loss, due to pandemic, from online education. He described various ways of identifying and quantifying the loss of learning and also described the possible solutions to compensate for such losses. They also suggested different assessment method for those students who are learning online.

The second technical session was chaired by Dr. Reema Mani [Instructor (Research Methodologies in teaching Practices) HBCSE].

Dr. Dawood Vaid (an educationist and trainer; also, co-founder of Sky Education, a pan-Asia education organization) in his talk mentioned that "Awareness" is the tool to stop the slowing down of educational process under the conditions of pandemic. Further, leaning of the balance from 'choice of teaching' to 'choice of self-education by students, is the central point to the endeavours of Dr. Dawood.

The next presentation was by **Dr. Aswathy Raveendran** (Reader, HBCSE).
In her wonderful lecture, Dr. Aswathy Raveendran, described the role of trinity of Science, Technology

and Society. The technological advancements must be fuelled by science and directed by the society so that they stay on course for human development. The education and in-depth study of social issues generated by scientific knowledge and technological development, must be the hub of this activity for a peaceful global development said Dr. Aswathy. She also elaborated the development of scientific study of science education.

There were fifteen contributed papers which were presented orally.

Here the teachers discussed the online education methodology in detail which in itself is a technological advancement.

Some of its advantages are listed below:
1. Ease of keeping records and sharing of resources, using social media.
2. Huge influence of virtual class rooms and computer-based learning games, that are available aplenty on the internet, on children's ways of learning.
3.Influence of language in science education was tried by translating various learning units of Vigyan Pratibha project in Marathi.
4. Specific methods were discussed as regarding use mobile and other devices to make the measurements more accurate in an easy way that the students find interesting.

Online education has some disadvantages too, like:
1. Lack of attention due to non-supervision.
2. Lack of human interaction and its negative impact on development of trust.
3. Lack of social interaction among children.
4. Social justice like gender equality and accessibility to technology.

Poster presentation:
There were five posters: Mathematics of music, Technology in conducting science experiment, Archimedes principle, Learning loss in online learning, and Connecting Science and Society. They all drew excellent attention from the participating teachers.

Day – two: Students' Exhibition via Video presentations.

The full exhibition, compiled by Dr. A. K. Rajarajan, is available on YouTube **(Link).** ← ← ←
The exhibition started with a video demonstration of **"how to make good amateur videos"** by Mr. Jyothish Babu. This nice introduction took the beginners a little bit beyond just playing around with mobile phones.
It was followed by another presentation featuring a wonderful compilation of YouTube channels on chemistry videos. Dr. Vimal Nath thus gave a comprehensive account of not only the "casual chemistry fun videos" but also those which will prepare the readers for competitive examinations.

The next video was a short presentation on Physics channels by Dr. A. K. Rajarajan which included interesting channels of biology too.

Students' contributions: In all, 26 videos were presented out of the 30 submitted by students of various schools in Mumbai and Navi Mumbai. Four of them, listed below, received a special mention.
1. Title: Cabbage indicator **Authors:** Abhirath Mehta & Tvisha Adira School: Utpal Shanghvi Global School. **Guiding Teacher:** Ms. Priyanka Gandhi

2. Title: Spiral Serpent. **Authors:** Divit Dhiren Langalia School: Utpal Shanghvi Global **School. Guiding Teacher:** Ms. Preeti Tiwari.
3. Title: From Ignorance to science (Marathi). **Authors:** Vedika Ghagre & Sanika Mahind **School:** NMMC School No. 18.
4. Title: Model of breathing (Marthi). **Author:** Reshmabanu Hakhim Shaikh

School: NMMC School No. 34.

VII. NATIONAL SCIENCE DAY-2022.

National Science Day-2022 **online programme** was conducted in association with Rayat Shikshan Sanstha's Karmaveer Bhaurao Patil College, Vashi, Navi Mumbai, on 27th Feb. 2021. The programme was inaugurated with opening remarks by Hon. Principal Dr. S. S. Nayak followed by Dr. A. M. Bhagwat's introduction to the programme. Special lectures were delivered on Noble prize-winning topics for the year 2021, as under:

1. The talk on Nobel Prize in Physics

The Nobel Prize in Physics for 2021 was awarded "for ground breaking contributions to our understanding of complex physical systems" with half the prize awarded jointly to Syukuro Manabe and Klaus Hasselmann "for the physical modelling of Earth's climate & reliably predicting global warming"; and the other half to Giorgio Parisi "for the discovery of the interplay of disorder and fluctuations in physical systems from atomic to planetary scales".

The talk on the above subject was delivered by Dr. Harshawardhan Bhatkar who is presently working as Assistant Professor at National Centre for Nanosciences and Nanotechnology, University of Mumbai. His presentation carried the title **"What is so complex about the complex systems and why should we care?"**

Harshawardhan Bhatkar

The prize in physics went to three pieces of work which only seemed to be connected by the "complexity" that they addressed. The contribution of human interference in global warming has forced humanity to ponder about its role on the planet with regard to climate dynamics. Such is the contribution of these three Nobel laureates. In his talk, he used simple examples and attempted to explain the very complex research that the three brilliant scientists have accomplished over decades of hard work. In no way the simplistic

explanation is the complete story, but it is only used as a means to motivate a curious mind to peep into the world of complex systems. The Nobel committee has made an attempt to connect three phenomenal pieces of hard work that comments on climate change. Is there a hidden message in it?

2. The talk on Nobel Prize in Chemistry

The Nobel Prize in Chemistry for 2021 was awarded to German Benjamin List and Scottish-born David MacMillan for their "pioneering work in asymmetric organocatalysis which led to development of a precise new tool for molecular construction".

The talk on the above subject was delivered by Dr. Dimple P. Dutta, presently a Senior Scientist in Chemistry Division of BARC & Associate Professor at Homi Bhabha National Institute, Mumbai. Her presentation is briefly described below:

Organic catalysts have a stable framework of carbon atoms, to which more active chemical groups, containing common elements such as oxygen, nitrogen, Sulphur or phosphorus can get attached. This results in environmentally friendly and cost-effective catalysts. Organocatalysis bind to the reacting molecules, on their own, to form short-lived intermediates that are more reactive than the substrate molecules.

Dimple P. Dutta

Organic catalysts have a stable framework of carbon atoms, to which more active chemical groups, containing common elements such as oxygen, nitrogen, sulphur or phosphorus can get attached. This results in environmentally friendly and cost-effective catalysts. Organocatalysts bind to the reacting molecules, on their own, to form short-lived intermediates that are more reactive than the substrate molecules.

Being **chiral**, the catalyst transfers its **handedness** to the substrate, controlling which side of the intermediate can react further. Organocatalysis is now recognized as the third pillar of asymmetric catalysis, next to enzymatic and transition metal catalysis. List, MacMillan and a host of chemists inspired by their work, are now discovering more and more organocatalytic reactions.

3. The talk on Nobel Prize in Medicine

The Nobel Prize in Medicine for 2021 was awarded to American scientists David Julius and Ardem Patapoutian for discoveries of receptors for temperature and touch which the award-giving body said could pave the way for new pain-killers. Their findings "have allowed us to understand how heat, cold and

Chitra S Misra

mechanical force can initiate the nerve impulses that permit us to perceive and adapt to the world around us". The talk on the above subject was delivered by Dr. Chitra Seetharam who is presently working as a senior scientific officer in the Molecular Biology Division of BARC. Her presentation carried the title:

Feeling the Heat!

Sensing the environment correctly, is important for all living organisms to survive and adapt to it. How we do this, is a question that has intrigued scientists for many years. Ability to sense heat & cold by touch is of special importance. While, in our daily lives, we take these sensations for granted, there are complex mechanisms involved in perception of these stimuli by our nerve endings to generate a signal.

In the talk she brought out the 'who', 'how' and 'why' of the Nobel Prize, awarded in the year 2021 in the field of Medicine for making advances in our understanding of how we sense our environment. The talk followed the timeline of discoveries that led to the study done by the present Nobel Laureates to their prize-winning work and its implications in the field of Medical Science.

VII. INTERNATIONAL MATHEMATICS DAY-2023.

The **International Day of Mathematics** (IDM) is led by the International Mathematical Union. It was **proclamated (an official formal public announcement)** by UNESCO on the 40th session of the General Conference, November 26, 2019. The first celebration was held on March 14, 2020.

March 14 was chosen as the date for the IDM. It was so because many countries were already celebrating it as Pi Day for the simple reason that this particular date appeared as 3/14 and the mathematical constant Pi is approximately 3.14.

The **IDM** is a worldwide celebration. Each year on March 14 all countries are invited to participate in it through activities for both students and the general public in schools, colleges, libraries and other places. It provides an opportunity to explain and celebrate the essential role that mathematics plays in breakthroughs in science and technology, improving the quality of life and contributing to the achievement of the Sustainable Development Goals of the 2030 Agenda (SDG1-17) of the United Nations. The event has a new theme every year. The theme for 2023 was **Mathematics for Everyone.**

This year Karmaveer Bhaurao Patil College, Vashi, faced several difficulties in organizing this event because the month of March was heavily loaded with university examinations. It was therefore organized on 20th March, instead of March 14 - the designated day. That too, only as a 2-hour event. Its brief report is presented below:

The Department of Mathematics and Navi Mumbai Science Foundation celebrated the "International Day of Mathematics" on 20th March, 2023. **A total of 75 students from graduate and post graduate level participated in the event.**

On this occasion Dr. G. A. Dhanorkar from Karmaveer Bhaurao Patil college Vashi, was the chief guest at the event. He delivered a talk on **"Modern Approach of Mathematics".**

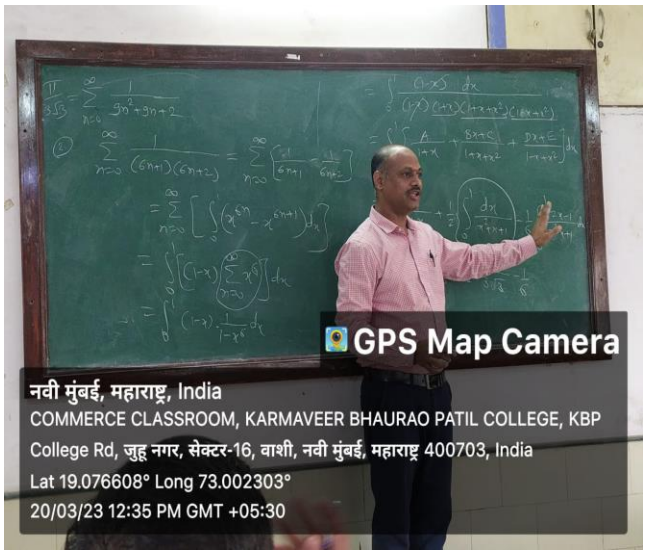
The objective of this programme was to enhance mathematical abilities by creating interest in mathematics. The programme was started with the Welcome speech of Ms. Pritee Jagadale and inaugurated by the Honorable Vice Principal Dr. C. D. Bhosale with an introductory speech. Information about the workshop and introduction of the Chief guest was given by Coordinator Ms. Shubhangi Phadatare madam. The Chairman of Navi Mumbai Science Foundation (NMSF). Dr. A. M. Bhagwat talked briefly about the various activities of NMSF and highlighted the importance of participation in an international event of this kind. After a brief introduction by Ms. Rajarshree Chavan, a talk on "Modern Approach of Mathematics" was delivered by Dr. G. A. Dhanorkar, Head Department of Mathematics, Karmaveer Bhaurao Patil college Vashi. In this lecture he discussed different approaches to various concepts in calculus such as

i) Maxima-Minima: He explained an alternative method other than the traditional method to find maxima-minima of the severable variable function i. e. by using gradient and Hessian matrix.

ii) Series: He focused on the finding value of convergent series with the help of integration and contour integration (residue theorem).

The session was interactive and helpful to the students. The feedback received from the students was positive. The Programme concluded with the Vote of Thanks given by Mr. Sudarshan Bhosale.

Students and Faculty members attending the talk



Dr. G. A. Dhanorkar making his presentation

IX. PUBLICATION OF E-MAGAZINE: EduREKA.

A total of 4 issues of E-magazine were released during the year, viz. i) April – June 2021, ii) July – Sept. 2021, iii) Oct. – Dec. 2021, & iv) Jan. – March 2022. **All these issues are available on NMSF web page: (http://navimumbaisciencefoundation.org/common/nmsf-Edureka.php)**

Some important topics covered in the issues were as follows…..

Issue	Article
1. April-June-2021	*Ranjitsinh Disale-Winner of "Varkey Foundation's Global Teacher Award-2020". *Outcome based learning. *Winners of Nobel Prize in "PHYSIOLOGY / MEDICINE in 2020. *Lingering doubts. *Friend or Foe.
2. July-Sept.-2021	*Maharashtra Nature Park: An Oasis for Birds in Concrete Desert …… *Great discoveries without sophisticated equipment. *Lingering Doubts – RAINBOW. *Students' Corner - Age of universe. *Activity question – Table Tennis ball in a glass.
3. Oct.-Dec.- 2021	*National Mathematics Day: Srinivasa Ramanujan. *Great discoveries without sophisticated equipment (…cont.). *Why I like Science. *The Ancient Indian Science Trinity. *Titration without indicator.
4. Jan.-March 2022	*National Science Day: Sir CV Raman. *Great discoveries without sophisticated equipment (…cont.). *A day in the life of Honey bee. *The Hidden story of Peepal. *Mission Shakti. *Activity Question.

Front pages of the issues are as under…

X. FUN WITH SCIENCE (FWS) PROGRAMMES.

This is a very interesting programme conducted by NMSF to promote independent thinking amongst students while learning science and enjoying the same. It is essentially conducted for middle school and high school level students using very simple gadgets to explain the basic principles of physics. Several such programmes have been conducted by NMSF in the past. During the period of this annual report two programmes were conducted as detailed below:

1. At Shree Gujarat Samaj, Vashi, on April 24, 2021, &
2. At Lohana Samaj, Koparkhairne, on May 8, 2021.

respectively, as part of their summer camp activity.

XI. ADMINISTRATIVE MATTERS.

During the period of this report, monthly EC meetings were held online, mainly for the physical convenience of the members, where all the scientific activities were taken up and discussed before & during their implementation. The Annual General Body Meeting (No.9) was held online zoom meeting on **Saturday, 09th April, 2022**, as an online zoom meeting. Most of the members attended all these meetings.

About renting office space: During the last 4 months of this reporting year, an all-out effort was made to buy / rent a small office space at some convenient location in Navi Mumbai. Accordingly, NMSF had a rented office at Vashi Plaza from April 1, 2022. It was vacated on Feb. 28, 2023, as NMSF could manage to buy its own place in Merchants' Chamber in Sec. 19, at Vashi.

The main agenda point was to appoint a new executive committee for the period "2022 to 2025" as the tenure of the existing committee gets over. The table below gives all the details.

Committee	**Outgoing Committee & its Duration**	**Incoming Committee & its Duration of**
	2019 - 2022	**2022 - 2025**
Committee Composition		
Designation	**Name**	**Name**
Chairman	Dr. A.M. Bhagwat	Dr. A. M. Bhagwat
Vice Chairman	Dr. A.K. Rajarajan	Dr. A.K. Rajarajan
Secretary	Dr. D. A. R. Babu	Dr. A.K. Rajarajan
Treasurer	Shri M.P. Bellary	Dr. K. P. Muthe
Member	Dr. P. R. Sangurdekar	Dr. P. R. Sangurdekar
Member	Dr. K. P. Muthe	Dr. P. K. Joshi
Member	Dr. S. T. Mehetre	Dr. S. T. Mehetre
Member		Dr. D. A. R. Babu
****Dr. P. K. Joshi was also nominated Editor of the quarterly E-Magazine****		

XII. 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. Their support comes in **KIND.**

The list of such organizations is as follows:

1) Homi Bhabha Centre for Science Education (TIFR).
2) New Horizon Public School, Airoli.
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) 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.

Our website: *http://www.navimumbaisciencefoundation.org*