Progress Report - 2016 - 2020
DBT Star College Scheme
Sophia College (Autonomous)

NAAC accredited 3.74 on a scale of 4 (in the third cycle)

Granted Autonomy in 2018

Details of Departments Supported

Sr. No		Name of the Department	Courses (B.Sc./M.Sc./PG Diploma, certificate etc) offered	Regular Faculty members *
1		Department of Chemistry	B.Sc., M.Sc. (Analytical Chemistry)	5 (3)
2		Department of Microbiology	B.Sc., M.Sc., Diploma in Clinical Analysis	6 (3)
3		Department of Life Sciences	B.Sc., M.Sc. (specialization in Neurobiology), Certificate course in Bioinformatics	(4) + 1 (DST – WOS -A) scholar + 1 (DST WOS-B scholar)
4		Composite Department (BZP)	B.Sc., M.Sc. (Biochemistry) Diploma in Quality Assurance in the Foods and Pharmaceuticals Industry	5 (4)

- **The numbers in parenthesis indicate the number of faculty with a Ph.D.**

Qualitative improvements due to DBT support

1. Laboratory skill enhancement

New instruments/ equipment purchased and the benefits:

- Multiple units purchased helped the students to perform experiments independently and explore beyond the syllabus.
- A number of new experiments could be conducted and many existing experiments were creatively extended. In the beginning, formal addition of the new experiments in the syllabus was not possible due to a fixed university syllabus. Once the College got autonomy, many of the new experiments encouraged under DBT star scheme could be introduced in the syllabus.



Qualitative improvements due to DBT support (Contd.)

2. Enrichment of students and staff

- There was an increase in experiential learning through industrial and field visits with the help of financial support from DBT
- The quality and the number of workshops conducted, seminars organized for students and faculty (teaching and non-teaching) development were increased.
- With the mandate and support of the scheme, a number of faculty received subject related training; a few were invited as trainer at state/national level and as resource persons to share their expertise.



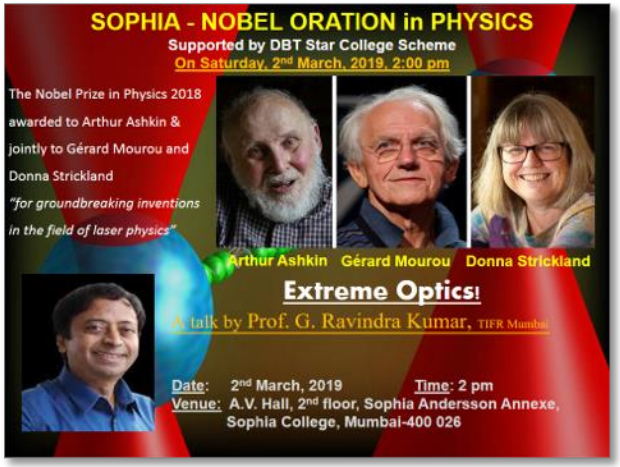

Qualitative improvements due to DBT support (Contd.)

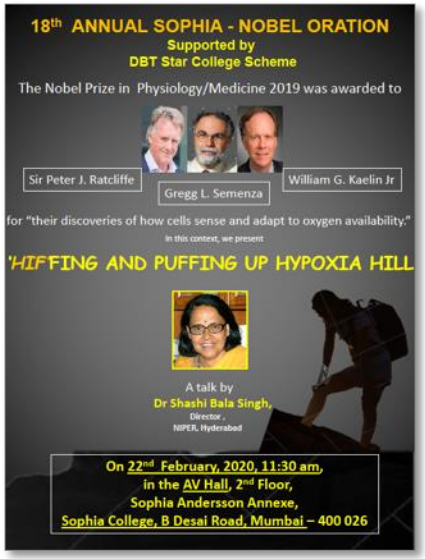
3. Improved social interaction and environmental awareness

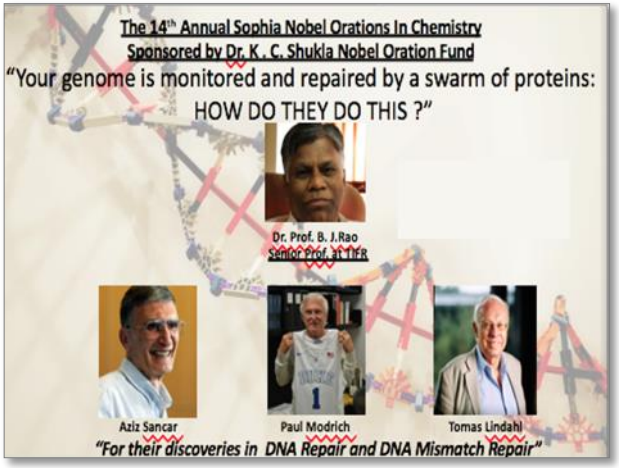
- The students have become more enthusiastic and interested. This has led to an increase in student participation in various intercollegiate events and competitions.
- There has been an enhancement of sensitization of students to socially relevant issues and social outreach.
- **Nobel Oration:** Annual Sophia Nobel Oration which discusses the Nobel Prize winning work by eminent scientists working in the field, is held every year in the fields of Physiology or Medicine /Chemistry/ Physics/Peace. It serves as a science update platform, open to all as a public lecture and creates an awareness.
- **Ananya,** a unique institutional academic College festival, which is based on the annual theme of the year, encourages each department, individually or in collaboration with other departments, to organize seminars/debates/ competitions/exhibitions and other activities for students and encourages an inclusive approach. The festival got an impetus with DBT support.

Qualitative improvements due to DBT support (Contd.)

Nobel oration







Qualitative improvements due to DBT support (Contd.)

'Zaika Maharashtra Ka' Ananya 2019

Ananya based on the annual theme of the College

Petri Art" an interdepartmental competition.

Feel the pulse by Dr Veena Yardi

TB *Harega Toh Desh Jeetega*

Plant pluck provide perish

Qualitative improvements due to DBT support (Contd.)

Ananya

The pursuit of Excellence with Integrity






Honor it up- Again", a competitive educative event with experiential learning and educative games

Paneer Fiesta

Qualitative improvements due to DBT support (Contd.)

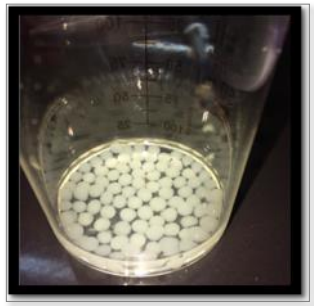
4. Innovative research activity

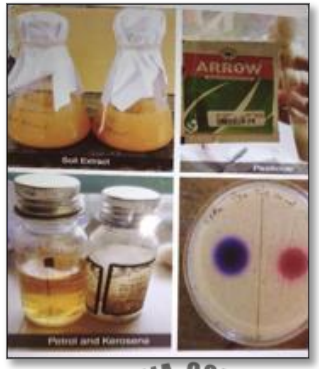
- **The Excellence in Science Program (EXSP)** which is has been running for over 25 years, permits few students, who are interested in pursuing academic interests beyond the syllabus, undertake activities such as seminar presentations, literature reviews and projects under the mentorship of staff members. The additional facilities and funds available through Star College Scheme, in terms of equipment and consumables, now permits these students to explore more challenging projects.
- There has been an increase in interdepartmental collaborations for research activities and projects.
- Immersive learning - Instead of select few students, all students were able to do hands-on projects and UG students could present their work in the College research meet, **'Quest' held on Science Day**.

Qualitative improvements due to DBT support (Contd.)

Some of the student projects undertaken

- 'Use of microbes in composting'
- Dyeing different types of fabric using various methods of application.
- Estimation of CaCO3 in different toothpaste samples using complexometric titrations and spectrophoto-metric estimations
- Effect of number of years of pre-schooling on academic outcomes
- Estimation of Fe in used blades and its use as raw material in preparation of Fe-nanoparticles.
- Gender based comparison of emotion recognition skills
- Detection of pathogens in ice-creams produced by large-scale manufacturers in Mumbai city.
- Kombucha: Worth the hype?
- Microbiological Analysis of Mayonnaise samples served at Local Vendors'
- Studying the antibacterial effect of ANTI-BAC Crompton LED bulb on endospore forming bacteria Bacillus cereus.
- Antibacterial and antifungal activity of copper nanoparticles





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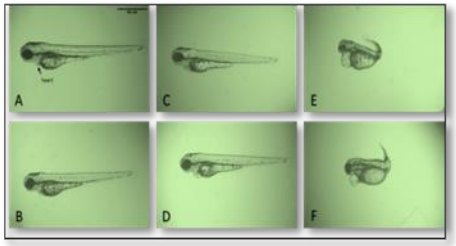
Qualitative improvements due to DBT support (Contd.)

Participation in Avishkar and National Conferences

- Fleme Rodrigues and Crissan Miranda of EXSP presented at a National conference 'Biofacet 2018-19 at Patkar College Goregaon on 15th February 2019. The title of the paper was "Antioxidant capacity and free radical scavenging activity of *P. marsupium* and *V. vinifera*.

- Poster Presentation on "Comparative antioxidant potential of two drought resistant medicinal plants of Rajasthan" on 14/12/2019 by Hamnah Ansari and Yashashwini Choudhary.

- Poster Presentation on "Synthesis of Tribromo Aniline - A Novel Green Approach" by Theresa on 14/12/2019.



- Response of developing Zebrafish Danio rerio) Embryos under Hypoxic Stress to Ethanol Toxicity. Eeman Shaikh & Afifa Siddique. Presented at the undergraduate level cleared the first round at the 13th Avishkar Research Convention 2018-19.

Qualitative improvements due to DBT support (Contd.)

Publications

- Surti, A. Ansari R (2018) Characterization of dye degrading potential of suspended and nanoparticles immobilized cells of Pseudomonas aeruginosa AR-7. Journal of Microbiology, Biotechnology and Food Sciences Vol. 8. 774-780 **(Scopus Indexed)**

- **Seven** publications in other journals

- **Three** publications in the in-house journal SCRIBE

Qualitative improvements due to DBT support (Contd.)

National Science Day and Quest

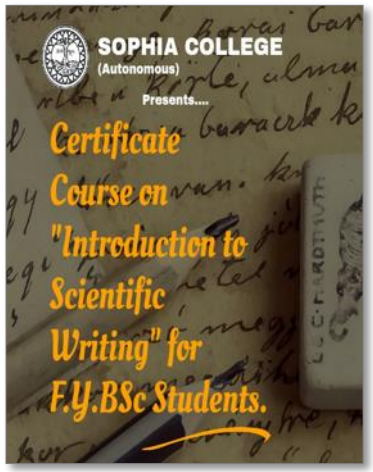
Dr. Subhojit Sen, on National Science Day

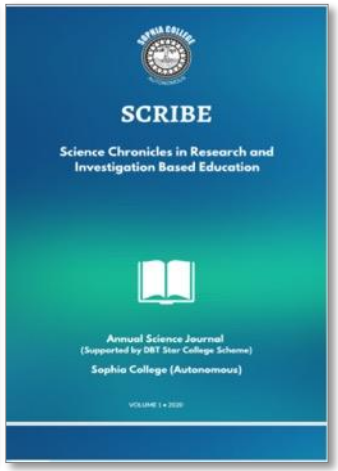
Poster presentation of project work on National Science day

Qualitative improvements due to DBT support (Contd.)

5. Communication skill development

- Students presented at state level research meet ‘Avishkar’, which led to publication (both for student and staff)
- Improved level of projects led to encouraged improvement of writing skills, through a course in scientific writing. It improved the quality of the in-house science newsletter, Spectrum, which is published in collaboration with the Department of Life Sciences and Biochemistry, St. Xavier’s College.
- A new journal SCRIBE was launched on 28th February, 2020, to mark the National Science Day.





New Experiments introduced and Extension of Existing Experiments

FYBSc	
Department of Life Sciences	05
Department of Microbiology	01
Department of Chemistry	04
Composite Department (BZP):	09

- Origami modelling of DNA
- To record campus biodiversity on mobile phones and using the department camera and digital documentation facility
- Preparation and efficacy testing of *Azotobacter* based biofertilizer from isolates obtained from soils in Mumbai
- Detection of nitrogen in fruit and vegetable sample to determine the presence of pesticides
- Separation of Plant pigments by Paper Chromatography
- Lissajous figure using Cathode Ray Oscilloscope
- Seven Segment Display using EX-OR Gate

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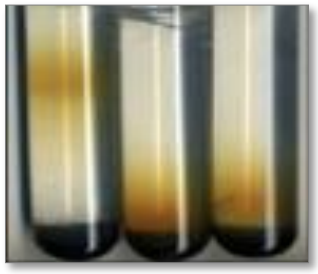
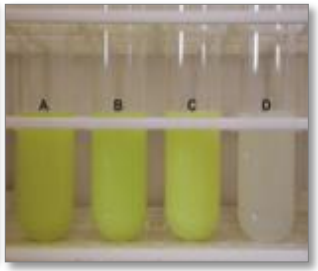
New Experiments introduced and Extension of Existing Experiments





SYBSc	
Department of Life Sciences	04
Department of Microbiology	10
Department of Chemistry	09
Composite Department (BZP):	06

- Enrichment and study of Iron Oxidizing bacteria.
- Alkaline phosphatase test for detection of phosphatase enzyme in milk.
- Preparation of indicator papers prepared from Natural vegetable sources and corresponding of pH scale to shade of colour
- Enrichment and study of purple sulfur bacteria, green sulfur bacteria, purple and green non-sulfur bacteria
- Green Chemistry experiment - Synthesis of cyclohexanone oxime using grindstone chemistry
- Estimation of aspirin content colorimetrically of commercially available tablets
- Effect of vermicompost (prepared on the campus) on growth of fenugreek seeds

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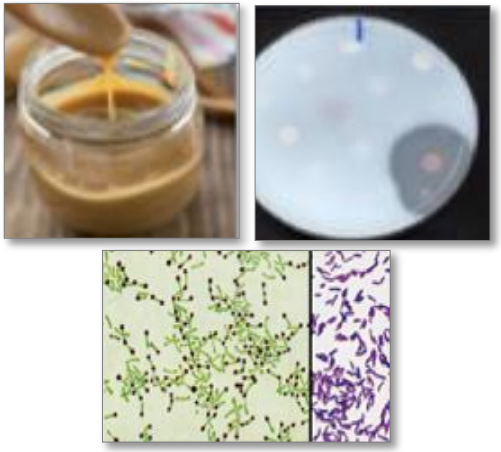
New Experiments introduced and Extension of Existing Experiments



TYBSc	
Department of Life Sciences	10
Department of Microbiology	12
Department of Chemistry	23
Composite Department (BZP):	06

- Comparison of lipolytic activity (titrimetric method)of different isolates obtained from spoilt foods rich in fats (ice-cream , cheese, coconut chutney, milk, peanut butter)
- To study the morphological and biochemical characteristics of *Corynebacterium diphtheriae*
- To study the pseudo hyphae of *Candida albicans.*
- Tracking the development of zebrafish embryos over 72 hours
- Estimation of stomatal index and determination of plant microclimate conditions
- UV protective effect of herbal extracts on bacteria
- Isolation of Chloroplasts from leaves and exploring effect of lights of different wavelengths on photosynthetic activity
- Estimation of acid neutralizing capacity of herbal antacids
- Preparation of iron nanoparticles from used blades
- Hands on training in use of Bioinformatic tools to corroborate with the theory and discussion of project work .

Experiential learning through Exhibitions/seminars/workshops /visits

Workshop Conducted	12
Exhibitions Organized	07
Competitions Held	04
Certificate Courses	02
Science Day Celebrations	03

- Techniques in molecular biology – with experts from Hi-Media
- Workshop for laboratory staff on use of pH meter
- Genome Awareness Program by Bionivid Technology (with KC College)
- Poster presentation on Tuberculosis Awareness: “TB Harega Toh Desh Jeetega”
- Regional workshop on RBPT at Sawantwadi – conducted by Dr. Roshan D’Souza & Dr. Rajbinder Dehia
- Darwin Fest - Competitive games
- Science communication - Certificate Course
- PETRI ART- creative plating of microorganisms
- Methods of Dyeing
- Careers in scientific communications – with follow up tests

Experiential learning through Exhibitions/seminars/workshops/visits

Exhibition on mangroves of Mumbai

Phiz fun – exhibition of working models of Physics

Genome Awareness Program (In collaboration with KC college)

Microvaganza

Workshop on soft skills with a focus on integrity “Mysteries of the Mind”

Workshop on safety in laboratories

Chem queen competition in Chemscope

Experiential learning through Exhibitions/seminars/workshops/visits


Nature trail at Khandala


Khandala seminar


NCL, Pune


Star gazing


Silvassa


ShilondaTrail


Reliance Ind, Vadodara


Khadi Gramodyog apiculture centre, Mahabaleshwar


Gowardhan Dairy


University of Mumbai


BARC

Peer teaching

The students were trained to demonstrate separation methods to F.Y.J.C class -TLC, Paper chromatography, Filtration using filter paper, Vacuum filtration, Simple distillation, Column chromatography and HPTLC

T.Y.B.Sc students explained to SYBSc students the techniques involved in clinical diagnosis.

Elephant Tooth paste

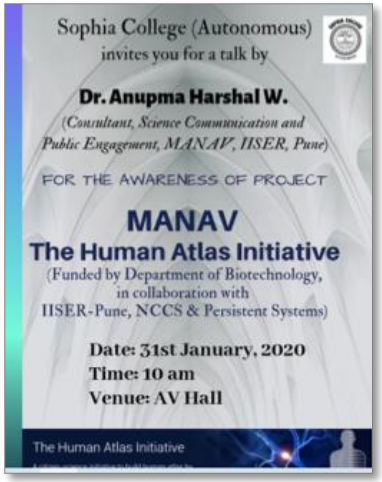
Students of Gopi Birla School were taught by T.Y.B.Sc. carry out basic Biology experiments

Popular and Invited lectures conducted

Sixty Three popular and invited lectures were conducted

Speaker/ organization	Topic
Dr. Saranath, Sunandan Divatia School of Sci	Awareness of throat cancer
Dr. Sorab Dalal , ACTREC	Strategies to combat radio- and chemo-resistance in tumour cells
Andrej Sali (UCSF)	Scientific modeling , Bioengineering and Therapeutics
Rujuta Divekar	Wonder food for wonder woman
Dr. Ramakrishnan, BARC	Analytical Instruments Touching Your Lives
Dr. Subhojit Sen, UM-DAE Centre for Excellence in Basic Sciences	“How the environment can shape us? Querying Lamarckian heresy through Cancer Epigenetics
Dr Anupama Harshal	MANAV- the Human Atlas Initiative funded by DBT in collaboration with IISER-Pune, NCCS and Persistent Systems
Mr. Shane Rydquist, Cactus Communications	Careers in Scientific writing

Popular and Invited lectures conducted



Real foods for wonder women by Rujuta Divekar

Careers in scientific writing by Shane Rydquist

Dr Sarnath on Throat Cancer

Training Received by Faculty

Faculty across the departments attended a total of Sixty Two Conferences / Workshops / Courses

Faculty	Conferences / Workshops / Courses attended
Hema Ramachandran, Medha Rajadhyaksh, Hema Subramaniam	26th Biennial Conference of The Asian Association for Biology Education, Goa, India September 20 – 24, 2016. ; All three presented papers
Rajbinder Dehiya, Sirisha Murthy	"Research Based Pedagogical Tools Workshop" at IISER, Pune.
Vijay J. Vig, Roshan D'Souza	STEM Teacher Training Workshop on Research Based Pedagogical Tools held from 23rd -25th January, 2017 at IISER, Mohali
Prabha Shetty, Sirisha Murthy, Lynelle Jeysus	Hands-on-workshop on organic electronics organized and conducted by Prof. Amitabh Banerji in collaboration with TIFR, Mumbai
Sree Nair	National Hands-on Training Workshop on Innovative Experiments in Biological Sciences for College teachers under Star college scheme at Ruia College
Jyoti Mantri	Presented a paper on 'Biofilms- stopping the microbial chatter', at an International Conference, on Biotechnology for Better Tomorrow-2020 Microbiologists Society, India and Maldives National University, Male

Training Received by Faculty (cont.)

STEM Teacher Training Workshops to develop Research Pedagogical Tools
10-12 March 2016 at IISER Pune.

RBPT workshop organized by DBT at IISER, Mohali

AABE conference

AABE conference

Training of Lab staff

Hands on training session for support staff (laboratory) on 'Good Laboratory Practices'

Workshop on pH metry

Reaching out to the society

- Community Outreach Program - at Rajgurunagar, Khed Taluka, Pune
- Plastic Pollution awareness - Conducted using several activities
- Nobel Oration lecture Series - Create awareness in the recent Nobel Prize winning field
- RBPT Workshop - conducted at Shri Pancham Khemraj (SPK) College, Sawantwadi
- Municipal School visit - at Haloli

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Reaching out to the society (cont.)



Rajgurunagar, Khed



Municipal Zilla parishad School at Haloli

Reaching out to the society (cont.)

Poster competition

Short film screening on the theme of 'BREAK FREE FROM PLASTICS'

The students visited Jagannath Shankarseth Municipal Secondary School to create awareness amongst the school children about moral values social issues like religious tolerance, and gender equality.


संशोधन अध्यापनातून शिकविण्याची पद्धत बदलेल!

RBPT Workshop - conducted at Shri Pancham Khemraj (SPK) College, Sawantwadi

SEED

The students were trained to demonstrate chromatography, traffic signal and colour experiments to Sophia Nursery children

SOPHIA COLLEGE AUTONOMOUS

Impact of Star College Scheme on Teaching Learning

- **RBPT** (Research Based Pedagogical Tools) workshops sponsored by DBT has not only trained many staff members but staff have been invited to participate in state level training also. This exposure has brought about a paradigm shift in pedagogy and motivates the students to become active learners.

- **SOP's (**Standard Operating Procedures) for the new experiments have been developed/created. This documentation will help to achieve efficiency for systematic and smooth conduction of the experiments. This has also helped in resource generation.

- **POGIL** (Process Oriented Guided Inquiry Learning) has been initiated by some staff members, which focuses on putting the students first and provides teachers with tools to optimize learning i.e. a shift in teaching- learning from being teacher centred to student centered.

- Encouraged by the mandate of Star College Scheme, **feedback** for every activity was sought, which today has become an essential part of all the activities undertaken. The feedback helps the organizers to know the interest of the stakeholders and thus improve, organize and plan better giving scope for continuous quality improvement

Impact of Star College Scheme on Teaching Learning (cont.)

RBPT workshop organized by DBT at IISER, Mohali

RBPT on preservation of Jam

सावंतवाडी : येथील कार्यशाळेचे उद्घाटन करताना खेमसावंत भोसले. शेजारी डॉ. विनायक दळवी, डॉ. रोशन डिसोजा, डॉ. डी. डी. गोडकर आदी.

अध्यापन कार्यशाळा राज्यात प्रथमच

डॉ. दळवी : सावंतवाडी एसपीके महाविद्यालयात उद्घाटन

सकाळ वृत्तसेवा

सावंतवाडी, ता. ९ : श्री पंचम खेमराज महाविद्यालयातील संशोधनपर अध्यापन कार्यशाळा राज्यात प्रथम घेतली आहे. याबाबतचे श्रेय प्राचार्य व समन्वयक व संस्थेला जाते. नवीन उपक्रमासाठी एसपीकेने नाव नेहमीच सुचित करतो. म्हणून असे कार्यक्रम पेणे आवडीने घेतले जातात. असे गौरोद्गार आज येथे मुंबई विद्यापीठ माजी प्राणीशास्त्र अभ्यासक डॉ. विनायक दळवी यांनी काढले.

आयसर पुणे व श्री पंचम खेमराज महाविद्यालय यांच्या वतीने तीन दिवसीय संशोधनपर अध्यापन आय. बी. पी. टी या विषयावरील कार्यशाळेचे उद्घाटन सिंधुदुर्ग जिल्हा शिक्षक प्रसारक मंडळाचे अध्यक्ष खेमसावंत भोसले यांच्या हस्ते झाले. यावेळी प्रमुख अतिथी डॉ. विनायक दळवी, आयसर पुणेचे समन्वयक डॉ. रोशन डिसोजा, मुंबई विद्यालयाचे प्रभारी प्राचार्य प्राचार्य डॉ. डी. डी. गोडकर, संस्थेचे सदस्य डॉ. सतीश सावंत, जयप्रकाश सावंत, प्रशिक्षक डॉ. मनोहर जी. एम, आयसर कन्सलंट डॉ. राजेंदर पुरिया, बायोलॉजीचे डॉ. मेहबूब पाशा, रसायनशास्त्रज्ञ डॉ. मयूर देसाई, भौतिकशास्त्रज्ञ डॉ. प्रसाद बापे तसेच जिल्ह्याभरातून आलेले गणित व विज्ञानचे प्राध्यापक, समन्वयक डॉ. गणेश मर्गज, प्राध्यापक व शिक्षकेतर कर्मचारी व विद्यार्थी उपस्थित होते.

यावेळी समन्वयक शांती पिसे यांनी आयसरची माहिती दिली. त्या म्हणाल्या, "आयसर ही भारतात अग्रगण्य संस्था आहे. यात बी. एस. एम एस व पीएचडी पर्यंत शिक्षण दिले जाते." डॉ. रोशन डिसोजा यांनी संशोधनपर अध्यापन विषयातील नाविन्यपूर्ण पद्धती शिक्षक कसे आत्मसात करू शकतील याबाबत माहिती दिली. तर संस्थेचे अध्यक्ष खेमसावंत भोसले यांनी संशोधनपर अध्यापनाचा माध्यमातून या कठीणकाळातील सर्वच प्राध्यापकांना फायदा होईल तसेच त्याच्या शिकवणीचा फायदा शिक्षकांना होईल असे यावेळी म्हणाले. सूत्रसंचालन रुपा कशाळीकर व मिशेल फर्नांडिस यांनी केले. या कार्यशाळेसाठी ५५ विज्ञान प्राध्यापकांनी सहभाग घेतला. आभार डॉ. पी. पी. सावंत यांनी मानले.

RBPT Workshop - conducted at Shri Pancham Khemraj (SPK) College, Sawantwadi

RBPT on Dengue & Malaria

Strengthening of unique institutional activities due to DBT support

- Excellence in Science Programme **EXSP**
- Annual **Ananya** based on the **theme** of the College
- Annual **Nobel oration** in Chemistry, Physics, Physiology and Peace
- Annual **Khandala seminar** and nature trail
- National Science Day celebration and **Quest - wider than the sky**
- Collaborative Newsletter **Spectrum** with St. Xavier's.
- **SEED** (Science Education through Experiments and Discovery)
- Course in **Scientific Writing**
- Publication of In house journal **SCRIBE**
- Adoption of Municipal Zilla Parishad school at **Haloli**
- **Documentation** of College Biodiversity

Future Plans

Strengthening the existing outreach program/ activities

- The Star College Scheme helped initiate outreach programs at a school at Rajgurunagar and also in Haloli, which is adopted by the NSS unit of the college where varied classroom activities, demonstration using simple experiments with hand - made models and some confidence boosting exercises were conducted. This experience drew enthusiastic response.
- If accorded Star status, it is planned to go to the next level and encourage the students to become facilitators of inquiry-based science learning. The mentoring would be done on a regular basis, by more frequent visits by groups of students. Online teaching tools will also be used to monitor and stay connected with the school students on a regular basis. It is also proposed to extend the programme to the community level and address issues like nutrition, health and hygiene so that the entire village benefits from it.

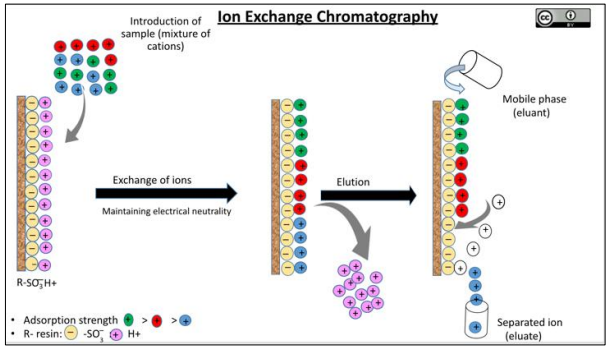


Future Plans

Creation of resource material for E – learning

- E-learning platforms like **Virtual Labs**, where learners can gain the experience of practical experimentation without any direct physical involvement or bench work are lacking.
- E-learning platforms would be of immense value in learning, especially in the current situation.
- The enhanced financial assistance, on acquiring the Star Status will allow us to purchase equipment that will enable us to prepare **videos** of many key experiments from the syllabus.
- It is also proposed that the **SOP's** created under the star college mandate will be compiled into an **E – manual** and will be uploaded as a ready resource and reference.

https://drive.google.com/file/d/1HTO8WgBXGUDx-5M_90PbM9jLGA_G-S-e/view



https://www.oercommons.org/courseware/lesson/70065

Thank you DBT Star College Scheme
for helping us reach this stage.

With support from you, we at Sophia will be able to realize our future plans and reach out to more students, institutions, and to the society at large.