A Report on the

5-Day Capacity Building Program

for

PGT Biology at

HBCSE, TIFR, Mumbai.

Dates: August 27 to September 2, 2023

The SCERT, Delhi Circular

State Council of Educational Research and Training
(An autonomous organization of Govt. of NCT of Delhi)
Varun Marg, Defence Colony, New Delhi 110024
http://scert.delhi.gov.in

F.No.-3(3)(xiii)/National Exposure/HBCSE/23-24/8803-8809 Date: 22/08/23

CIRCULAR

Sub: Five Days Capacity Building Program of PGT Biology/ Officer of Directorate of Education, GNCTD and SCERT faculty at HBCSE, TIFR, Mumbai.

SCERT Delhi is organizing a Five Days Capacity Building Program for PGT Biology/ Officer of Directorate of Education, GNCTD and DIET/ SCERT faculty at Homi Bhabha Center for Science Education (HBCSE), TIFR, Mumbai. The 40 participants will attend the program from 27 August to 2 September at HBCSE, TIFR, Mumbai (including travel dates).

Objectives of the program :

- To promote hands-on experiential learning.
- To nurture creativity and conceptual understanding through real-life examples.
- To integrate experimentation and observation with Biology learning.
- To expose with an alternative pedagogy of Biology.

Schedule of the program :

Date:	28 August -1 September, 2023 (excluding travel dates)
Departure:	(Delhi- Mumbai, by Air): 27 August, 2023
Arrival:	(Mumbai - Delhi, by Air): 2 September, 2023
Venue:	HBCSE, TIFR, Mumbai
Participants:	38 PGT Biology & 1 Officer (As per list provided by Concerned Department) and 1 Assistant Professor from SCERT .
Coordinator:	Dr. Amit Sharma, Assistant Professor, SCERT, Delhi.

The concerned Heads of Schools and DDE (zones) are hereby requested to ensure that all the participants whose name appears in the list are to be deputed to attend the training program without fail.
The **ANNEXURE-A** includes the list of participants for the training program.

This issues with prior approval of the competent authority.

(Dr. Nahar Singh)
Joint Director (Academic)

F.No.-3(3)(xiii)/National Exposure/ HBCSE/23-24/8803-8809 Date: 22/8/23

Copy to:

1. P.S. to Secy. Education/Chairperson, SCERT, Delhi
2. P.S. to Director (Education), DoE, GNCTD
3. P.S. to Director, SCERT, Delhi
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5. OS IT, DoE, GNCTD
6. WIM SCERT, Delhi
7. Guard File

(Dr. Nahar Singh)
Joint Director (Academic)

The Participants of the Capacity building Program

Annexure- A			
S. No.	Name Of Participant	Employee ID	Office/School address
1	V SELVARASU	20025384	School Branch, HQ, Old Secretrait
2	DR. SHIVRAJ SINGH	19940755	SBV KRISHNA NAGAR DELHI - 110051 (SCHOOL ID: 1003013)
3	Mahendra Singh Meena	20000722	GBSSS NAJAFGARH NO.1 (SCH.ID- 1822063)
4	SABITA VARUN	20071663	SARVODAYA VIDYALAYA No.1 MORI GATE
5	Sunil Kumar Dubey	19940467	SBV Ashok Nagar (1515002)
6	Kalawati	19990411	SKV RAJOURI GARDEN MAIN (1515022)
7	JYOTI CHOPRA	19945121	SKV Ramesh Nagar-1516027
8	MEENAKSHI VARUN	19911095	West Vinod Nagar-SKV-1002032
9	CHANDRABOLI GHORAI	19945126	Dwarka, Sec-5- RPVV-1821286
10	RAM KISHORE VERMA	19960184	Patparganj-SBV (Genda Lal Dixit)(1002002)
11	Bijay Singh	20051081	GBSSS, SU Blk, Pitampura 1411017
12	Leena Saxena	19940346	SKV, H Block, Ashok Vihar Phase-1, Delhi 1411026
13	Hema Kumari	20191476	GOVT. CO-ED, SSS, SITE-1, SEC-6, DWARKA, NEW DELHI
14	AJAY KUMAR	20101756	Core Academic Unit,Exam Branch, DoE, Delhi
15	BINAY PRABHA BAGE	19990966	SISTER NIVEDITA SKV, A-BLOCK DEFENCE COLONY NEW DELHI
16	SHAILENDRA SONY	20092610	Dwarka, Sec-19- RPVV-1821285
17	Pawan Kumar	19925060	GBSSS, PAPRAWAT (SCH. ID- 1822263)
18	Prem Chandra Vishwakarma	20036751	RSBV SURAJMAL VIHAR
19	DHARAM PAL SINGH	19931743	Bhola Nath Nagar-SBV (Babu Ram)
20	SHASHANK TIWARI	20220388	GCSV PHASE-III SEC-21 ROHINI DELHI- 1412289
21	SUMIT KHANNA	20224440	Rani Khera-S(Co-ed)V-1412095
22	AKANKSHA BHATNAGAR	20025489	GGSSS CHHATARPUR (1923048)
23	MANISHA MEENA	20220554	Roop Nagar, No.1-G(Co-ed)SSS-1207039
24	SHREE RAM SINGH	19980266	SBV, J BLOCK, SAKET, ID-1923056
25	Bhagwati Prasad Sharma	20035052	Madanpur Khadar, No. 1- GBSSS-1925448
26	PREETI TIWARI	20025112	GSKV, H BLOCK MANGOLPURI
27	VIRENDRA KUMAR SHARMA	19910461	RPVV Gautam Puri
28	RAJESH KUMAR MEHTA	19980715	GBSSS Khajoori Khas Delhi -94
29	CHANDRA MOHAN MISHRA	19990986	SOSE, Sector- 10, Dwarka-1821291
30	Pushpa Kumari Birath	19990261	GOVT. CO-ED SSS SEC-5 R.K.PURAM
31	Dr. Nawab Singh	19950467	Janak Puri, Block D-SBV
32	ROHIL GUPTA	20093058	SBV DELHI CANTT. TIGRIS ROAD ,N.D. -110010
33	Ram Murti Singh	20080436	RANHAULA SBV -1617227
34	ASHOK KUMAR	20210279	GBSSS BAPROLA, 1617258
35	RAM CHARAN SHARMA	19900547	GBSSS JANTA FLATS NAND NAGRI DELHI -93
36	MIRZA IFTAKHAR BAIG	19980554	GBSSS JASOLA VILLAGE (1925353)
37	Ashok Vishwakarma	20000614	Shahdara, Mansarovar Park, No.1-GBSSS
38	Surendra Pal Singh	20051188	SBV, BT Block Shalimar Bagh-1309005
39	Dibya Prakash Singh	20040512	Dr. Mukherjee Nagar-SV-1309003
40	Dr. Amit Sharma (Coordinator)	20008	SCERT, Delhi

Objectives of the Capacity Building Program:

- To promote hands-on experiential learning,
- To nurture creativity and conceptual understanding through real life examples.
- To integrate experimentation and observation with Biology
- To expose with an alternative pedagogical approach in biology.

Participants:

39 attendees, including PGT Biology teachers, one officer from the Directorate of Education (DOE), and one Assistant Professor from SCERT, with Dr. Amit Sharma as the program coordinator.

The session plan of the program:

STATE COUNCIL OF EDUCTIONAL RESEARCH AND TRAINING , NEW DELHI
Course design for INSET programme of PGT Biology, 2023

Day/ Time	09:00 - 09:30 am	09:30 - 10:45 am	10:45 - 12:00 pm	12:00 - 12:30	12:30 - 01:45 pm	01:45 - 03:00 pm
1	Grp 1	Introduction to theory & practical syllabus, Distribution of work as per CBSE , Framing of questions, Discussion on CBSE Question Paper and Scoring.	Genetics -DNA Packaging, Repliction, Translation, Transcription(Class XII)		Hands on experiment ofDNA isolation(ClassXII)	Animal physiology -ULTRAFILTRATION - KEDNEY (XI)
	Grp 2	Genetics -DNA Packaging, Repliction, Translation, Transcription(Class XII)	Introduction to theory & practical syllabus, Distribution of work as per CBSE , Framing of questions, Discussion on CBSE Question Paper and Scoring.		Animal physiology -ULTRAFILTRATION - KEDNEY (XI)	Hands on experiment ofDNA isolation(ClassXII)
2	Grp 1	ECOLOGY- Growth Models, Mathematical Expression(Class XII)	DNA fingerprinting, Lac Operon, Gene Expression (XII)		Hands on Experiment Test for Protien, sugar, Albumin,etc.(XI)	
	Grp 2	Hands on Experiment Test for Protien, sugar, Albumin,etc.(XI)			ECOLOGY- Growth Models, Mathematical	DNA fingerprinting, Lac Operon, Gene Expression (XII)
3	Grp 1	Neural Control & coordination (XI)	Biomolecules-Structure and Fuctions, Enzymes.		Hands on Practice (Experiment) of pollen germination, Onion root tip (Class XII)	
	Grp 2	Hands on Practice (Experiment) of pollen germination, Onion root tip (Class XII)			Neural Control & coordination (XI)	Biomolecules-Structure and Fuctions, Enzymes.
4	Grp 1	Recombinant DNA technology(Class XII)	Biotechnology-Application(Class XII)		Respiration Kveb's cycle Glycolysis	Respiration -Balance Sheet -Amphibolic Pathway -RQ
	Grp 2	Respiration Kveb's cycle Glycolysis	Respiration -Balance Sheet -Amphibolic Pathway		Recombinant DNA technology(Class XII)	Biotechnology-Application(Class XII)
5	Grp 1	Biotechnology selectable markers, cloning, RNA interferon,insulin production(Class XII)	Locomotion & Movement Muscle Contraction, Sliding Theory		Evolution -Speciation -Hardy Weinberg -Founder's Effect Principle -Adaptive Radiation	Principle of Inheritance -Linkage & Crossing over
	Grp 2	Locomotion & Movement Muscle Contraction, Sliding Theory	Biotechnology selectable markers, cloning, RNA interferon,insulin		Principle of Inheritance -Linkage & Crossing	Evolution -Speciation -Hardy Weinberg

BREAK

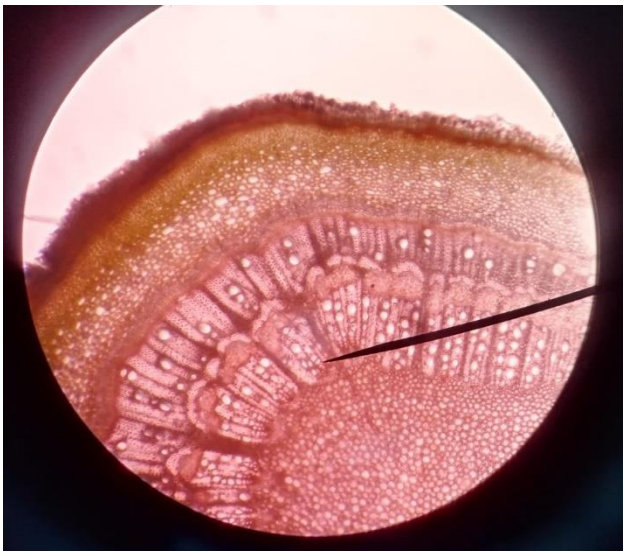
Day 1: August 28, 2023

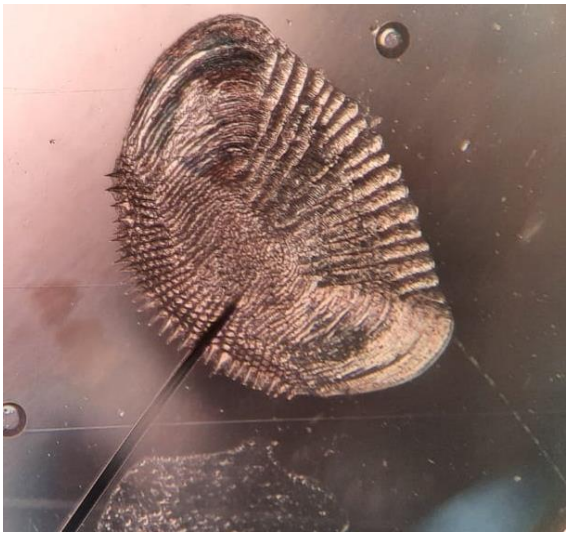
The program commenced with registration. Dr. Savita, Dean, HBCSE, TIFR introduced the activities, followed by a schedule briefing from Dr. Vikrant. Participants were divided into two batches, one focusing on biochemistry experiments and the other on microscopy experiments.

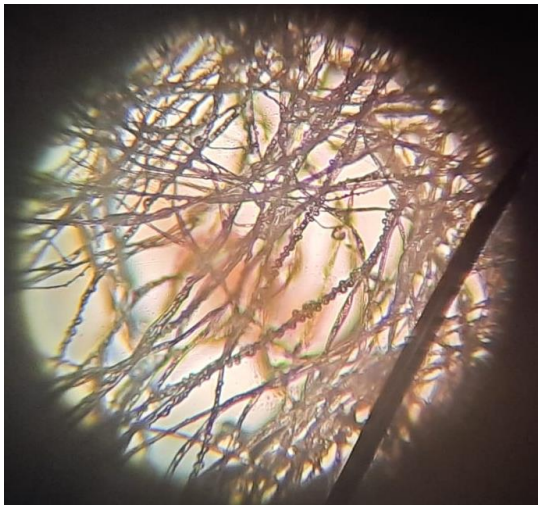
Biochemistry Experiments:

- Determination of Enzyme activity and T.S. of Dicot Stem, along with T.S. of a leaf.
- Quantitative and qualitative experiments using vegetable extract (cabbage) and fruit juice (apple) as enzyme sources.
- Skills acquired: Use of micropipettes, cuvettes, colorimeter, falcon tubes, and working with various dilutions.

Microscopy Experiments:







- Study of plant tissues (T.S. of leaf and stem).
- Examination of various scales.
- Observation of live microbial cultures, including paramecium feeding voraciously on stained yeast.

The day was both fruitful and interactive, with participants gaining hands-on experience and guidance from the program staff.

Day 2: August 29, 2023

The teacher training program commenced promptly at 9:00 AM in the HBCSE Olympiad Building. Professor Arnav, the director of HBCSE, led the program. He delivered a 30-

minute interactive session covering various advancements in technology, focusing on the groundbreaking Alpha Fold and its implications for evolutionary biology. The talk sparked discussions on the integration of technology and Biology.

Lab Session 1 (10:00 AM - 12:30 PM): Following the opening session, the teachers divided into groups and proceeded to their respective labs. They engaged in hands-on activities related to DNA extraction from spinach leaves. The process involved grinding and centrifugation to obtain the DNA. Subsequently, they conducted agarose gel casting, which was done using a casting tray. This practical session aimed to provide teachers with practical insights into fundamental molecular biology techniques. The lab activities were successfully completed by 12:30 PM.

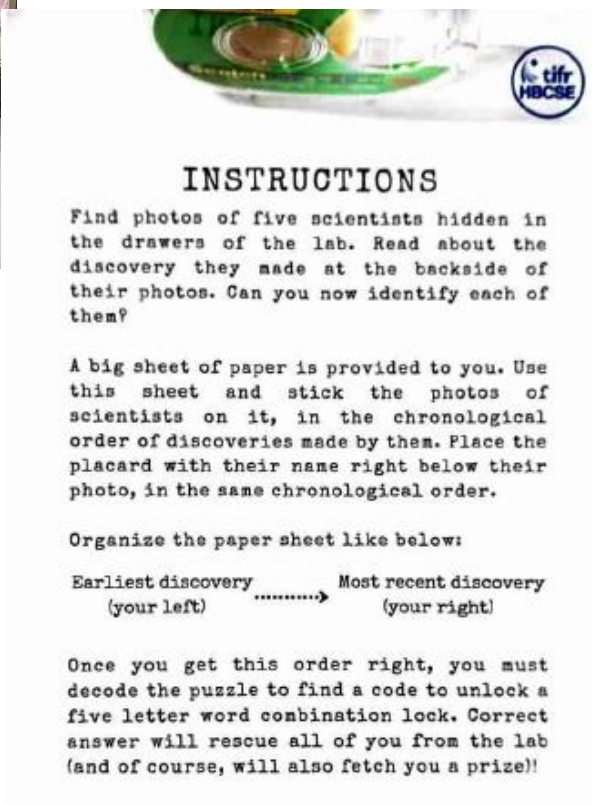
Lunch Break (12:30 PM- 1:30 PM): Teachers took a well-deserved lunch break from 12:30 PM to 1:30 PM. It was an opportunity for networking and informal discussions among the participants.

Lab Session 2 (1:30 PM- 2:30 PM): After lunch, teachers returned to the labs. They focused on loading the extracted DNA samples into the wells of an agarose gel. This step aimed to separate and visualize the DNA fragments based on their size using

electrophoresis. The hands-on experience enhanced their understanding of gel electrophoresis techniques.

Guest Lecture by Professor Mahendra Sonawane (2:30 PM - 3:30 PM): Zebrafish: A model to understand animal development and disease mechanism At 2:30 PM, Professor Mahendra Sonawane delivered an enlightening session on zebrafish as a model organism for studying animal development and disease mechanisms. The presentation highlighted the unique attributes of zebrafish and how they contribute to scientific research.

Tea Break (3:30 PM - 3:45 PM): A short tea break provided teachers with a chance to refresh and engage in informal discussions.



INSTRUCTIONS

Find photos of five scientists hidden in the drawers of the lab. Read about the discovery they made at the backside of their photos. Can you now identify each of them?

A big sheet of paper is provided to you. Use this sheet and stick the photos of scientists on it, in the chronological order of discoveries made by them. Place the placard with their name right below their photo, in the same chronological order.

Organize the paper sheet like below:

Earliest discovery (your left) ..... Most recent discovery (your right)

Once you get this order right, you must decode the puzzle to find a code to unlock a five letter word combination lock. Correct answer will rescue all of you from the lab (and of course, will also fetch you a prize)!

Gel Observation and UV Transilluminator Session (3:45 PM - 4:30 PM): Teachers gathered in the lab at 3:45 PM to observe the DNA bands in the agarose gel using a UV transilluminator. This activity enabled them to visualize the separated DNA fragments, reinforcing the concept of electrophoresis.

Puzzle Solving Activity (4:30 PM - 5:35 PM): As the program drew to a close, participants engaged in a puzzle-solving activity related to the polymerase chain reaction

(PCR). The challenging exercise tested their understanding of the technique and its applications.

Gel Observation and Puzzle Solving Activity:

Participants observed DNA bands in the agarose gel using a UV transilluminator and engaged in a PCR-related puzzle-solving activity.The day offered insights into molecular biology techniques, technology, and model organisms.

Day 3: August 30, 2023

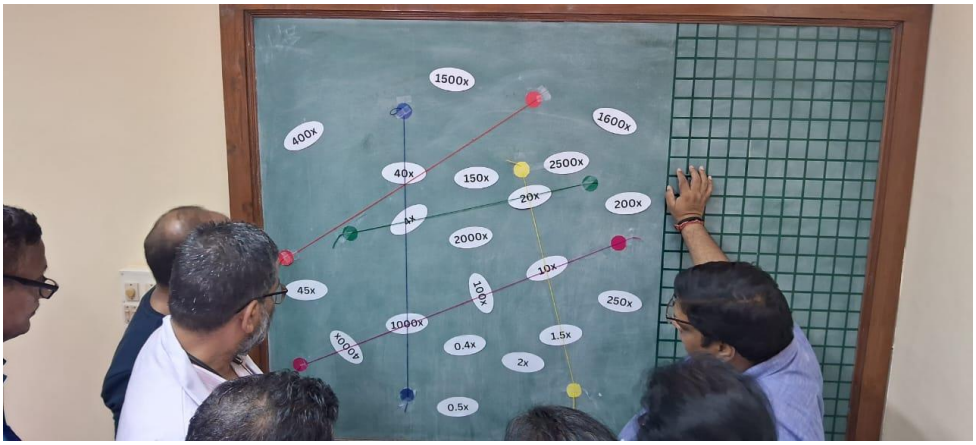
The program included sessions on bacterial vectors, restriction enzymes, cloning, lab work, a puzzle session, and a talk on transcriptomics by Dr. Archana Iyer.

Day 4: August 31, 2023

The morning session focused on Drosophila culturing and crosses, followed by a talk on the Gal 4-UAS system. Teachers also visualized Hydra cultures and participated in a puzzle-making activity.

Day 5: September 1, 2023

Teachers explored biosystematics and ethology, engaged in tasks related to numerical taxonomy, fish behavior studies, and molluscan shell classification. Puzzle presentations and feedback sessions were held.



Conclusion:

The capacity-building program successfully provided hands-on experience, exposure to modern biology techniques, and opportunities for networking and learning alternative pedagogical methods. Participants expressed their heartfelt gratitude to the dedicated teaching staff at HBCSE for their invaluable guidance, support, and the enriching training program they had provided.

Departure: On September 2, 2023, all participants safely departed from HBCSE, carrying with them not only knowledge and skills but also a deep sense of appreciation for the teaching staff's contributions to their professional growth and development.