

**Report of Teacher Professional Development Programme for  
Integrated Tribal Development Project Office, Pen  
CESME, HBCSE  
(Under PMMMNMTT scheme of MHRD)**

Date: August 05-09, 2019



**Homi Bhabha Centre for Science Education  
Tata Institute of Fundamental Research  
August 2019**

## I] Introduction

This workshop was organized for middle school science & mathematics teachers, as part of CESME (HBCSE) activities under PMMMNMTT scheme of MHRD. 44 teachers teaching grade 6 & 7th students, in 30 tribal schools, attended the five day workshop.

- **Objective & rationale :**

The primary objectives of the workshop were

- Generating opportunities for tribal school teachers, to engage with science teaching-learning process, through hands-on experiments and investigations.
- Exploring the predominant pedagogical strategies in the tribal schools pertaining to mathematics education and thereby empowering the teachers to ameliorate the existing instructional models for mathematics in their schools.
- **Expected Impact :**

It was expected that, through this workshop, teachers will learn how to make students understand different science concepts in simple ways, through activities & experiments. They will also get to learn more about basic concepts in mathematics like fractions, ratios etc. & will come up with some solutions for the difficulties they face while teaching mathematics & science in school.

- **Target Group :**

Middle school Science & Mathematics teachers

## II] Background: Pre-workshop visits

### Visit 1:

**Place of Visit:** Integrated Tribal Development Project office, Pen & Ashram School, Varavne.

**Date of Visit:** 04 June, 2019

This was the first visit of HBCSE members to Integrated Tribal Development Project office, Pen in the context of conducting workshops for middle school science & mathematics teachers. HBCSE members also visited Ashram school, Varavne after this meeting.

**Objective:** To discuss about organizing 4 workshops in consecutive 2 years for science and mathematics teachers of Grade 6, 7 & 8, of Government and Aided Ashram Schools.

- The objective of the meeting was discussed with Assistant Project Officer (APO), Mr. Sheramkar of Integrated Tribal Development Project.
- In the meeting, it was decided that
  - a) From 24 Ashram schools, two teachers from each school will participate in the workshops.
  - b) For the first year of this project, the focus will be on grade 6 and 7 & in the next academic year focus will be on grade-8.
  - c) All expenses for participants (like food, accommodation, travelling) during this

workshop will be provided by HBCSE under the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching Scheme at CESME, HBCSE.

- d) APO will share this project plan with Ashram schools teachers and then finalize the date of the workshop after discussing with HBCSE.

### **School visits:**

#### **Objective**

- To understand teachers expectation from the workshop, the difficulties they face while teaching in Ashram schools and students' difficulties in the learning process.
- To understand the existing teaching-learning scenarios and facilities available in the schools.

#### **Overview of school visit 1**

**Place of Visit:** 1) Aided Secondary Ranpakhara Ashram School, Warap  
2) Govt. Ashram School, Sai, Panvel

**Date of the visit:** 11 July 2019

- During the visit to Ranpakhara Ashram School, teachers had asked for combined sessions for mathematics and science. As most of the teachers are teaching both the subjects in class 6 and 7.
- Teachers of Ashram school, Sai shared the topics in mathematics that the students find difficult to understand, like percentage, addition & subtraction of fractions etc.
- They also mentioned that they don't have teaching-learning materials for Mathematics.

#### **Overview of school visit 2**

**Place of Visit:** 1) Govt. Secondary & Higher Sec. Girls Ashram School, Karjat, Bhaliwadi;  
2) Aided Primary, Secondary & Higher Sec. Ashram School, Chikhle

**Date of Visit:** 16th July 2019

During this visit, Ashram school teachers had freely shared their problems pertaining to teaching in Ashram schools. Some of their primary problems were concerning:

- The impacts of local languages on students
- Students' difficulties in understanding the textbook language.
- Vastness of syllabus

Teachers were very clear about what they want to achieve from this workshop.

### **III] Methodology**

The workshop focused on the first term syllabus of science & mathematics of grade 6 & 7th. The methodologies adopted to achieve the objectives of the workshop include hands-on science/learning by doing, POE approach, learning through constructivism, research reading etc. Also, a session about the nature of science was incorporated in the workshop since it is crucial for effective science teaching-learning process.

- Sessions & Resource Persons :**

**Total No. of sessions = 23**

**No. of Resource persons = 19**

<b>Sr. No.</b>	<b>Title of the session</b>	<b>Resource Persons</b>
1	Connected Content Knowledge in Effective Teaching	K. Subramaniam
2	Making Connections: Nature of School Mathematics	
3	Profound Understanding of Number concepts	Aaloka Kanhere
4	Mathematics Laboratory	
5	Algebraic Thinking	
6	Making Sense: Signed Quantities	Harita Rawal
7	Mathematics Laboratory	
8	Making Connections: Fractions and Ratios and Proportions	Shweta Naik
9	Proportional Reasoning	
10	Planning Ahead: Field Objectives	
11	Decimal Quantities	Sushant Pawar
12	Nature of Science	Sugra Chunawala
13	The Living World: Adaptation and Classification	Narendra Deshmukh & Sandhya Thakur.
14	Activity-Based Learning (Yes, you can do it)	Mayuri Pawar, Karun Hambir & Prakash Navale
15	Measurement of Physical quantities	Mayuri Pawar & Karun Hambir
16	Hands-on Microscope	Narendra Deshmukh, Karun Hambir & Sandhya Thakur
17	Nutrition & Diet	Rohini Karandikar & Sandhya Thakur
18	Toys & Fun	Ravi Sinha
19	Design & Technology (Disaster Management)	Anisha Malhotra Dalvi, Adithi Muralidhar, Rupali Shinde & Arundhati Dolas
20	Motion, Force & Work	Vinod Sonawane & Rihana Inamdar
21	Designing Worksheet/Activity Sheet (Natural Resources)	Narendra Deshmukh, Prakash Navale & Sandhya Thakur
22	Static Electricity & Heat	Vinod Sonawane, Mayuri Pawar & Rihana Inamdar
23	Mathematics laboratory	Aaloka Kanhere, Harita Rawal & Sushant Pawar

## IV] Feedback received from the participants

During the workshop, daily oral feedback sessions with the duration of 30mins were conducted in the morning. Through these sessions, we attempted to provide the teachers with a platform to express their opinion about the usefulness of each session conducted in the workshop. They were also encouraged to share their key takeaways from the sessions and give suggestions to enhance the quality of the workshop.

In addition, written feedback was collected through an open-ended questionnaire to understand the overall impact of the programme, relevance of the workshop and suggestions for improvement.

### Lecture sessions:

- The '**Nature of Science**' session increased the curiosity and it can be implemented in the classroom teaching.
- From '**Designing worksheet/activity sheet**' session, we learnt to prepare different types of worksheets & understood what precautions should be taken to make worksheets effective & student-friendly.

### Science sessions:

- '**Measurement of physical quantities**' session made the measurement very easy & changed the approach towards the topic completely.
- '**Nutrition & Diet**' session was effective as we got the knowledge in a simple way & discussed about the nutrients which are available surrounding our & students locality.
- '**Toys & Fun**' session was fun & informative as science can be studied by using very simple & cheap resources.
- '**Design & Technology**' (Disaster management) session was very good. Innovative activities made various concepts clear. Easy to carry materials & models, student-friendly, could learn a lot from this session. Helpful for long term memory for students.
- '**Motion, Force & work**' session made the complex topic (Scalar & Vector) very simple & interesting.

### Overall feedback of the workshop

- All the sessions gave us new information & different tricks & tips for our day to day classroom teaching.
- The training is different from the training we attained earlier.
- We never got bored as all the sessions were lively.

### Feedback about facilities & accommodation

- Happy with lodging & food.

## V] Follow-up

For follow up of this workshop HBCSE members visited different Ashram schools after one and half month of the workshop and observed how teachers were implementing different ideas, tricks which they learnt during this workshop in their classroom teaching & how the teaching-learning process is going on in Ashram school for Science & Mathematics subjects.

### **School 1: 26th September 2019**

#### **Name of the School: Government Ashram school, Waravne, Pen**

In this school, the science laboratory was well-equipped with scientific equipment. And during our visit, some students from 7th and 9th grade demonstrated science experiments. The Principal was very passionate about the overall development of the school. From the discussion, we found that students are finding it difficult to learn mathematics.

### **School 2: 26th September 2019**

#### **Name of the School: Primary Ashram School, Chirner, Uran**

In this visit, Dr. N. D. Deshmukh & Mr. K. T. Hambir interacted with students of grade-6 on various topics of science, mathematics and day to day life.

While interacting with students one point we all noted was when asked about anything every student of the class used to raise a hand but when we used to ask particular one to answer, then most of them used to stay silent instead of answering. Only a few students were interacting well.

### **School 3 & 4:**

**Place of Visit:** 1) Govt. Ashram School, Dolavali, Taluka-Khalapur, Raigad  
2) Govt. Ashram School, Bhaliwadi

**Date of visit:** 18th October 2019

During school visits, we discovered that the school infrastructure and other facilities available to students varied greatly even among the Government Ashram schools. Despite these differences we could interact with a motivated science teacher in one of the deprived schools. This teacher had not only implemented the strategies that she learned from the workshop but also applied it for other topics.

Also, HBCSE resource persons & teacher participants have made Whatsapp group where teachers share the activities they conducted in their classrooms through videos, photos etc. On this group, they can also share the difficulties they face while teaching any particular topic in Science & Maths. Group members can share various useful information regarding making the teaching-learning process better. Also, a follow-up workshop is planned in the month of November-2019

## V] Notes on the conduct of the workshop

The participants in this workshop were interactive, showing interest to learn different tricks, tips, techniques for the betterment of the teaching-learning process.

### Highlights of the workshop:

- Interaction of HBCSE members and Ashram schools teacher participants.
- Communication & exchange of ideas among the participants.
- Group discussion among the people engaged in the betterment of science & mathematics teaching-learning process.
- Everyone seemed to be happy together & discussed issues which affect them.

### Books given to the teachers participants:

1. विज्ञान प्रश्नमंजुषा
2. गणित संज्ञाकोश-१ (भूमिती)
3. गणित संज्ञाकोश-१ (बीजगणित)
4. अध्यापन गणिताचे - भाग १
5. अध्यापन गणिताचे - भाग २
6. स्त्री-पुरुष भेद
7. कुतूहल ज्यू. १
8. कुतूहल ज्यू. २
9. कुतूहल ज्यू. ३
10. कुतूहल ज्यू. ४
11. विज्ञान गमती
12. गणित शिक्षणातील महत्वाची वाचने

## VI] Statistical Data:

Sr. No.	Type of School	No. of schools	No. of Science & Maths teachers	Std. 6			Std. 7			Total no. of students of grade 6th & 7th impacted through the workshop
				Boys	Girls	Total	Boys	Girls	Total	
1	Government	14	25	294	319	613	370	354	724	1337
2	Aided	10	19	258	261	519	309	279	588	1107
	<b>Total</b>	<b>24</b>	<b>44</b>	<b>552</b>	<b>580</b>	<b>1132</b>	<b>679</b>	<b>633</b>	<b>1312</b>	<b>2444</b>





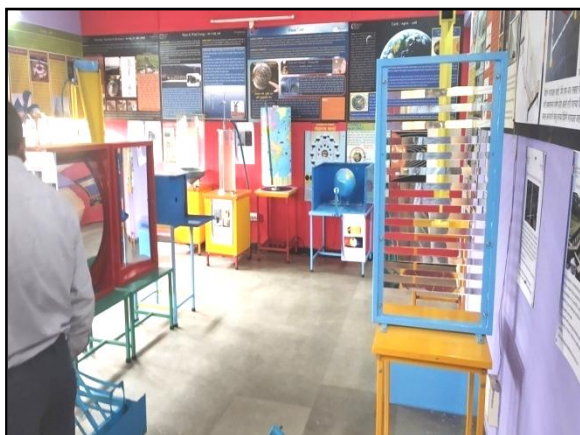
**Ashram school buildings in four regions  
of Maharashtra**





## Glimpses of the pre-workshop school visits

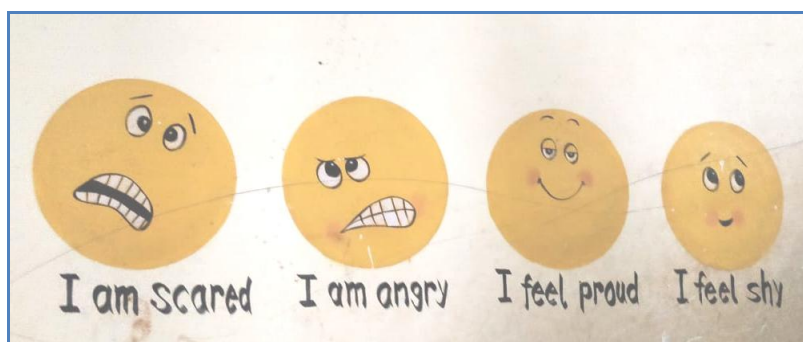
Mini science centre in an ashram school



A program organized by students on the occasion of 'Guru Purnima'



Pictures indicating emotions painted on the wall of an ashram school



## Glimpses of the workshop

Understanding nature of science through activity



*Participants  
engaged in the  
discussion on  
'Nutrition &  
Diet'*

Designing activities and discussing about student-friendly worksheets





## Glimpses of the activities observed during post-workshop school visits



## Annexure A: Schedule of the workshop

Day/ Time	09:00 – 9:30	09:30 - 11:00	11:15-12:45	L u n c h  B r e a k	01:30 - 03:00	03:15 – 04:45	05:00 – 06:30
August 5, 2019  Day 1  Mon	Registration	Connected Content Knowledge in Effective Teaching  K. Subramaniam	The Living World: Adaptation and Classification  Narendra D & Sandhya Thakur		Activity Based Learning (Yes, you can do it)  Karun Hambir Mayuri Pawar & Prakash Navale	Profound Understanding of Number concepts  Aaloka Kanhere	Mathematics Laboratory  Led by Aaloka Kanhere
	Introduction & Inauguration						
August 6, 2019  Day 2  Tue	Feedback  Harita / Sandhya Thakur	Nature of Science  Sugra Chunawala	Measurement of Physical Quantities  Mayuri Pawar & Karun Hambir		Making sense : Signed Quantities  Harita	Making Connections : Fractions, Ratios & Proportions  Shweta Naik	Mathematics Laboratory  Led by Harita
August 7, 2019  Day 3  Wed	Feedback  Harita / Sandhya Thakur	Proportional Reasoning  Shweta Naik	Algebraic Thinking  Aaloka Kanhere		Designing Worksheet/Activity Sheet (Natural Resources)  Prakash Navale Narendra D & Sandhya Thakur	Nutrition & Diet  Rohini Karandikar & Sandhya Thakur	Toys & Fun  Ravi Sinha
August 8, 2019  Day 4  Thurs	Feedback  Harita / Sandhya Thakur	Designing activities for Disaster management  Anisha Malhotra Dalvi, Adithi Muralidhar, Rupali Shinde & Arundhati Dolas	Motion, Force and Work  Vinod Sonawane & Rihana Inamdar		Decimal Quantities  Sushant Pawar	Making Connections : Nature of school Mathematics  K. Subramaniam	Mathematics Laboratory  Led by Harita, Sushant Pawar & Aaloka Kanhere
August 9, 2019  Day 5  Fri	Feedback  Harita / Sandhya Thakur	Planning Ahead : Field Objectives  Shweta Naik	Static Electricity & Heat  Mayuri Pawar Vinod Sonawane & Rihana Inamdar		Hands on Microscope  Sandhya Thakur, Narendra D & Mayuri Pawar	Workshop report presentation	
				Conclusion and Valedictory			

## Annexure B: List of teacher participants

Total no. of participants – 44

Total no. of schools- 30

Sr. No.	Name of the participant	Gender	Designation	Institution
1	Purna J. Patil	F	Asst. Teacher	Govt. Ashram School, Bhaliwadi, Karjat, Raigad
2	Sashikala T. Birajdar	F	Asst. Teacher	Govt. Ashram School, Bhaliwadi, Karjat, Raigad
3	Shaila Vishwas Thakur	F	Asst. Teacher	Ashram School, Chikhli, Panvel
4	Namdev Barkya Bhukare	M	Asst. Teacher	A.S. Ashram School, Wakadi
5	Vaijnath Damodar Zinje	M	Asst. Teacher	Govt. Ashram School, Sawarsai
6	Arun Appa Karade	M	Asst. Teacher	Govt. Secondary Ashram School, Verul, Mandangad
7	Khandu Maruti Pichad	M	Asst. Teacher	Aided Prathamik Ashram School, Chirner, Uran
8	Vasant Ballal Joglekar	M	Asst. Teacher	Aided Ashram School, Vavloli, Sudhagad
9	Krishna Narayan Mokal	M	Asst. Teacher	Govt. Ashram School, Sai, Panvel
10	Chintaman Dattatrey Dabir	M	Asst. Teacher	Aided Ashram School, Chive, Sudhagad
11	Dinesh Sadanand Patil	M	Asst. Teacher	Govt. Ashram School, Sai, Panvel
12	Surekha Pramod Patil	M	Asst. Teacher	Govt. Secondary Ashram School, Varavane
13	Krishna Hari Wargude	M	Asst. Teacher	Aided Madhyamik Ranpakharan Ashram School, Varap
14	Kirti Krishna Bhoir	F	Asst. Teacher	Aided Madhyamik Ranpakharan Ashram School, Varap
15	Deepali Santosh Gharat	F	Asst. Teacher	Aided Madhyamik Ashram School, Padsare, Sudhagad
16	Meghana Mukund Bhadavalkar	F	Asst. Teacher	Aided Primary Ashram School, Padsare, Sudhagad
17	Ranjana Angad Chate	F	Asst. Teacher	Aided Adivashi Ashram School, Chive
18	Usha Laxman Pawar	F	Asst. Teacher	Govt. Ashram School, Varsai
19	Vijay Baliram Patil	M	Asst. Teacher	Govt. Ashram School, Varsai
20	Milind Prabhakar Patil	M	Asst. Teacher	Govt. Ashram School, Kolghar, Alibaug
21	Nitin Narayan Nikam	M	Asst. Teacher	Aided Ashram School, Mangaonwadi
22	Manoj Dayal Sakharkar	M	Asst. Teacher	Aided Ashram School, Mangaonwadi
23	Arun Ganu Patil	M	Asst. Teacher	Aided Ashram School, Uttekhola, Mangaon
24	Rama Motiram Madage	F	Asst. Teacher	Aided Ashram School, Uttekhola, Mangaon
25	Vijaya Vikas More	F	Asst. Teacher	Govt. Ashram School, Chaphewadi
26	Jyoti Suresh Wagh	F	Asst. Teacher	Govt. Ashram School, Varavane
27	Nayana Narayan Warde	F	Asst. Teacher	Govt. Ashram School, Savarsai
28	Nilesh Krishna Sonavane	M	Asst. Teacher	Govt. Secondary Ashram School, Dolivali
29	Sunil Chandrakant Niwate	M	Asst. Teacher	K.B.H. Aided Primary Ashram School, Taloshi
30	Anuradha Gurav	F	Asst. Teacher	Eklavya Ashram School, Wavloli
31	Prakash Keshar Tivare	M	Asst. Teacher	Govt. Ashram School, Sanegaon, Roha
32	Digambar Subhashrao More	M	Asst. Teacher	Govt. Ashram School, Sanegaon, Roha
33	Jagdish Changu Mengal	M	Asst. Teacher	Govt. Ashram School, Kolghar
34	Baburao Manik Ghodake	M	Asst. Teacher	Govt. Ashram School, Veral
35	Surekha Ashok Kamble	F	Asst. Teacher	Govt. Ashram School, Dolivali

<b>Sr. No.</b>	<b>Name of the participant</b>	<b>Gender</b>	<b>Designation</b>	<b>Institution</b>
36	Mahadeo Chandrakant	M	Asst. Teacher	Aided Primary Ashram School, Chirner
37	Ravindra Ganpatrao Kalambe	M	Asst. Teacher	Govt. Ashram School, Chafewadi, Karjat
38	Dnyaneshwar Anantrao Shinde	M	Asst. Teacher	Govt. Secondary & Higher Sec. Ashram School, Pathraj, Karjat
39	Rajkumar Ramchandra Mate	M	Asst. Teacher	Govt. Secondary & Higher Sec. Ashram School, Pathraj, Karjat
40	Ganesh Shantaram Patil	M	Asst. Teacher	Govt. Secondary & Higher Sec. Ashram School, Pinglas, Karjat
41	Deepak Chandrakant Dahivalikar	M	Asst. Teacher	Govt. Secondary & Higher Sec. Ashram School, Pinglas, Karjat
42	Vijay Sudam Pawar	M	Asst. Teacher	Govt. Primary School, Nandvi, Mangaon
43	Ratnakar Maruti Keni.	M	Asst. Teacher	Aided Ashram School, Wakadi
44	Arvind Eknath Waghmare	M	Asst. Teacher	K.B.H. Aided Primary Ashram School, Taloshi

### **Annexure C: List of resource persons at the workshop**

<b>Sr. No.</b>	<b>Resource Persons (HBCSE)</b>
1	Aaloka K.
2	Adithi M.
3	Anisha M.
4	Arundhati D.
5	Harita R.
6	K. Subramaniam
7	Karun H.
8	Mayuri P.
9	Narendra D.
10	Prakash N.
11	Ravi Sinha
12	Rihana Inamdar
13	Rohini K.
14	Rupali S.
15	Sandhya T.
16	Shweta Naik
17	Sugra Chunawala
18	Sushant P.
19	Vinod S.

## Annexure D: Certificate of the workshop

**Homi Bhabha Centre for Science Education**  
Tata Institute of Fundamental Research

*Centre of Excellence in Science and Mathematics Education*  
(a scheme of Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching of the MHRD)

### **CERTIFICATE OF PARTICIPATION**

This is to certify that

**P. J. PATIL**

has successfully completed the 5-day residential workshop for Middle School Science and Mathematics Teachers (Part I) held at the Homi Bhabha Centre for Science Education, Mumbai from August 5 to 9, 2019 organised under Teacher Professional Development Programme for Integrated Tribal Development Project Office, Pen.

This certificate holder is now eligible for attending the second part of the workshop.

**Dr. Narendra Deshmukh**  
Academic Coordinator (Science)

**Prof. Sugra Chunawala**  
Dean, HBCSE Faculty

**Dr. Shweta Naik**  
Academic Coordinator (Mathematics)