PAC- 23. 22 Report
on
Capacity Building Programme on Practical Works in Geography for Secondary Stage Teachers at Western Region

The National Education Policy (NEP) 2020 emphasizes the experiential learning-based education which making more engaging, inclusive, and learner-cantered regarding practical works in Geography. In teaching Geography in schools, practical learning tools can create immersive learning experiences by integrating instruments, interactive maps, charts, best out of wastes, multimedia resources such as videos, simulations. This programme explores and develop materials from curricular goals of NCF-SE in which any discipline studied Geography theoretical way such as definition of maps, mountain ranges, water cycle, climate change etc but also analyse the cause-effect relationship with the help of practical study of Geographical content. Geography is the key to understand the intricate web that connects our world's physical landscapes, diverse cultures, and delicate environments. Geography without practical works (scale, map, map projection, data collection, data representation, data analysis, weather map, instruments, field work, remote sensing and GIS etc.) look like a doctor without medical tools. Dynamic and holistic understanding of the environment or the world (earth) is possible after understand the geography practically, then produce learners with ample experience, concern and can act sustainably upon any environmental problem. The objectives of this programme are to develop the competency about importance of geographical content practically in real life related to weather, climate change, topography, map, ICT, Geospatial technology etc. Well planned learning of practical works in geography adds clear value to learning in the subject as well as providing a positive contribution to the wider curriculum. Students gain first-hand, practical experiences which support and reinforce knowledge, skills and concepts about the practical Geography in either indoor or outdoor classroom. In this way, Students can integrate concepts from many different areas of science, social science, and the humanities, and apply critical thinking to understanding and dealing with current issues of local, national, and international importance. Therefore, in the contemporary time, In the light NEP 2020, arts of mapping, environmental studies, technology, holistic development, global citizenship etc. are influenced under the aura of geography that is practically try to understand through this training programme.

A five-day capacity-building program on "practical works in Geography" was organized for Key Resource Persons (KRPs) from the Western Region States and Union Territories and held from 9th to 13th December 2024 at the Regional Institute of Education (RIE), NCERT, Bhopal, Madhya Pradesh, the program aimed to enhance practical integration with theoretical content in Geography and enhance the skills to easy understand. A total of 40 KRPs participated, including 8 from Maharashtra, 6 each from Gujarat and 9 Chhattisgarh, and 11 from Madhya Pradesh, 6 from Goa, representing a collaborative effort to empower educators with modern teaching tools and strategies.

Day 1: 9th December 2024

The registration of KRPs and the inaugural session of the program took place between 9:30 and 10:15 AM. The session was graced by Prof. Jaydip Mandal, Principal of RIE-NCERT, Bhopal, alongside Prof. Chitra Singh, Head of DEE, and Dr. Suresh Kumar Makwana, Head of DESSH. The event was chaired by Dr. Alka Singh while Dr. Soyhunlo Sebu, delivered a heartfelt Vote of Thanks, marking a ceremonious beginning to the program. Dr. Singh explained the NCERT's ICT initiatives, such as MOOCs on SWAYAM, DIKSHA, and ePathshala, were discussed in detail. She highlighted the importance and benefits of integrating hands-on based learning such as Geospatial technology, ICT, instrumental, mapping, other practical appliances in school education, emphasizing how it equips students with essential skills. At the same time, the potential side effects of digital sources usage among school children were also addressed. After the registration, pre-test was conducted to assess the existing knowledge among the KRPs of these states.

The **first session** of the program was conducted by **Dr. Hemant Patidar** on the topic of Geography coordinate system. He had defined and differentiate the key concepts of parallels of latitudes and meridians of longitudes. At the same time, locate the exact position of any place on map and globe, and measure the distance and know the relative location from any other known place. A special focus was placed on the calculation of time and know the date, day of any region from any other given place, time and day.

The **second session** of the program was conducted by **Dr. Satheesh Chotthodi** on the topic of Scale. He talked about the reduced representation of whole or part of the earth surface on a plane surface. Scale is the ratio of measurement. Map scale the ratio between map distance and its corresponding distance on the ground. At the same time, he focused on map with scale that indicates equal divisions marked with readings in metric (kilometers) and British (miles) units. The ratio in the map scale will used to find out the ground distance with reference to the distance represented in a map. Map scale is the tool for displaying the ground features proportionally on the map. Therefore, map scale is the part of scientific process.

The **third and fourth session** of the program was conducted by **Dr. Soyhunlo Sebu** on the topic " Step-by-Step Guide to Generate Contours for an Area of Interest (AOI) Using QGIS". During this session, he talked about contours, relief, slope, aspect and it is shown with the help of Geospatial integrated hands-on. At the same time, Contours are imaginary lines joining places having the same elevation above mean sea level. A map showing the landform of an area by contours is called a *contour map*. A special focus was placed on the method of showing relief features through contour is very useful and versatile. The contour lines on a map provide useful insight into the topography of an area. This module uses the QGIS open-source Geographic Information System tool to generate contours for the Area of Interest (AOI).

Day 2: 10th December 2024

The **fifth session** was conducted for practicing laboratory work with the help of map, instrument, formulas (pencil, scale, etc.). This session included detailed imagine and communicate direction and distance of any place to stakeholders and use of their day-to-day life. Through the help of orange, **Dr. Hemant** showed a fun based analytical measurement for understanding the latitude, longitude, map from 3-D earth as orange and 2-D on paper as the peel layers of orange. In this way, KRPs drawn horizontal lines on them with sharpie pens. Further, KRPs peeled them and try to lay the peels flat to represent the difficulty of mapping a round object (the Earth) on a flat, two-dimensional surface like a map. Moreover, insides the orang, natural longitude lines present and they could split the orange in half to represent hemispheres.

The **sixth session** conducted for doing hands-on learning with the help of system and software (QGIS) by **Dr. Soyhunlo Sebu**. The session included detailed step-by-step

instructions are provided to guide users through the process effectively. A special focus was placed on the platforms Bhuvan and School Bhuvan, which introduce students to the basics of geospatial technology. The session included a step-by-step activity on School Bhuvan to familiarize participants with its practical applications. This highlighted the necessity of improving school infrastructure to ensure the successful integration of technology in education.

The **seventh session** was taken by **Dr. Chandrakesh Maury and Dr. Alka Singh** delivered an insightful instructive and demonstration-based lecture on the visual image interpretation in which recognize objects in our daily lives based on their form, size, position, and relationships with other objects. He highlighted also these attributes of things which are referred to as visual interpretation elements and the attributes of the objects can be further divided into two major groups: landscape features and image characteristics. He demonstrated the step - by - step procedures of the satellite imagery (LISS - 3, LISS – 4 and Sentinal) download from Bhoonidhi portal and Copernicus etc. Dr. Alka delivered the importance of satellite imagery and compare with the Google Earth Image.

The **eight session** of the program was conducted by **Dr. Satheesh Chotthodi** on the topic of Scale which is based field, laboratory and instruments. KRPs of this capacity building programme are drawn scale on ground and point out some station and calculate the R.F of the given scale. In this situation, scale drawn from ground to paper in real sense. However, by the insightful lecture of Dr. Satheesh, KRPs understand type of scale and the graphical construct on paper and solve the metric system question very easily through the help of tenth division inch scale.

Day 3: 11th December 2024

The **nineth session** of the program was conducted by **Dr. Hemant Patidar** on the topic of Map projection. He talked about the need of map projection, basic concepts, principles, types and key terms related to it. At the same time, he focused on the methods of drawing the graticule of map projection by graphical and mathematical methods. By incorporating such methods, he demonstrated the drawing method of projection and explain the uses of various map projection techniques.

The **tenth session** was conducted for practicing laboratory work with the help of map, instrument, formulas (pencil, scale, protector, compass, setsquare etc.). KRPs are drawn

the map projection on basis of graphical and mathematical construction. They construct Mercator, cylindrical equal area projection and understand the basic difference between them under the guidance of **Dr. Hemant**.

The **eleventh session** of the program was conducted by **Dr. Satheesh Chotthodi** on the topic of topographical maps. He talked about the topographical sheets, symbols, features etc. He reveals the numbering system of toposheet and how it is affecting the scale of this map. At the same time, he talked about relief which is the natural irregularities on the earth surface. Conventional signs and symbols and different colors are extensively used for encoding various physical and cultural features. The elevation and depressions are represented with different methods in the topographical sheets.

The **twelfth session** of the program was conducted by **Dr. Satheesh Chotthodi** for practicing the topographical numbering system, identifying the landforms based on contour gaps and position. KRPs played a game to set the toposheets number according to scale by western region's states (Madhya Pradesh, Gujarat, Goa, Chhattisgarh, Maharashtra) under the guidance of Dr. Satheesh. He demonstrated the wooden cut piece to show the contour and relief features on the earth surface.

Day 4: 12th December 2024

The **thirteenth session** was delivered by **Dr. Lokendra Singh Chauhan and Dr. Alka Singh** at STEAM Park of RIE- NCERT, Bhopal. They delivered very insightful lecture regarding the interdisciplinary science. In which, solar watch, sun spots visualize by telescope, position of latitude on any point of earth by handmade model, level of eutrophication, relative humidity measurement by wet and dry bulb thermometer.

The **fourteenth session** was taken by **Dr. Alka Singh and Mr. Chandrakesh** on Google Earth Pro. Using Google Earth Pro, she showcased the process of creating paths and river drafting with precision and creativity. By exploiting the platform's powerful tools, she demonstrated how to trace a river's course accurately, creating a virtual representation of natural waterways. By setting waypoints along a desired trajectory, users can create lines or curves using Google Earth Pro's path creation feature. She highlighted how to adjust these waypoints to mirror the river's natural twists and turns, ensuring that the digital path aligns closely with the actual geographical feature.

In the **fifteenth session**, **Dr. Dinesh Kumar** delivered an insightful lecture on the core concepts of data collection, data analysis, and data representation. At the same time, calculate the mean, median, mode of different data and understand the structure of data. Dr. Dinesh then transitioned the Geographical data processing and its important because it can help us understand and analyze the world around us. His approach made these complex concepts easier to understand, providing practical examples that linked theory to real-world maps with a fantastic way to represent data visually, graphically. In which, learners can show relationships, patterns, and trends that might not be immediately obvious from raw data. He talked about the use of tools like: Tableau - For building interactive maps with data visualizations; ArcGIS - For advanced geographic data mapping and analysis; QGIS - A powerful open-source tool for creating custom maps and visualizations; Google Maps API - For creating custom interactive maps with data overlays.

In the **sixteenth session**, **Dr. Chandramauli** delivered an insightful lecture about the weather or season, attention is drawn to various elements like air, wind, speed, direction, rain, wind, and humidity. He talked the weather elements include temperature, rainfall, pressure, wind, humidity, sunlight and cloudiness and which define the variations in these elements day-to-day and can change frequently. His approach made these complex concepts easier to understand, the weather charts are representations of weather phenomena of the world or a portion of it on a flat surface. A given day represents circumstances linked with various meteorological factors such as temperature, rainfall, sunlight and cloudiness, wind direction and velocity, and so on.

Day 5: 13th December 2024

In the **seventeenth session**, by incorporating such technologies **Dr. Chandramauli** demonstrated the geographical representation map of the world or one of its regions at a given time that depicts the weather conditions like temperature, pressure, direction, and velocity of the wind, humidity, clouds, visibility, nature, and amount of precipitation with the help of the metrological symbols. He emphasised on the development of analytical capacity to understand the region's weather conditions at a specific time with the help of maps and various symbols. At the same time, ease the handling of weather instruments for knowing the weather components of the area. In

this way, learners will be able to be aware of the weather precautions and try to maintain the weather components in day-to-day life by daily activities.

In the **eighteenth session**, by incorporating such technologies, **Dr. Dinesh** demonstrated how designed the proportional diagram, flow map, isoline map, cartogram, climate map, disaster map etc. In this way, these kinds of journey of data from collection to representation can create a more dynamic and interactive classroom environment. KRPs also played a game to set the Indian states within 3 minutes.

The **nineteenth session** was taken by **Dr. Alka Singh** on Google Earth Pro. Area, perimeter, length etc. measured and locate the any feature on the map with their real position (coordinate point) by the help of Google earth pro software. Download the toposheets from survey of India, account create in Survey of India, USGS etc. This demonstration not only illustrated the software's utility for cartographic and planning purposes but also emphasized its ability to visualize real-world terrains effectively. In her demonstration, she explained the significance of river rafting for geographical analysis and urban planning. She taught how to use the software's capabilities, such as elevation profiles. Using satellite imagery, to assess the river's flow and surrounding topography. The paths that were drafted might then be used as a foundation for additional research, including ecosystem management, or infrastructure development. Her meticulous approach in using Google Earth Pro underlined the platform's potential to advance geospatial projects, delivering a hands-on approach to produce detailed and accurate renderings of natural environments. This discussion enhanced the knowledge in practical works in Geography and aware with the importance of content utilization of practical geography in real life. The content is designed according to NCERT's textbooks (Practical works in Geography) and framed different pedagogical tools and assessment which indicating a need for broader dissemination of these resources. During the session, the KRPs shared their experiences of regarding practical geography into the teaching-learning process, offering valuable insights. However, they also expressed concerns about the lack of adequate infrastructure in school. This highlighted the necessity of improving school infrastructure to ensure the successful integration of content of practical and experiential learning.

Assessment

The capacity building training program's continuous assessment approach. In which a pre-test was conducted to check the existing knowledge of the KRPs related to practical work in Geography. This programme assessed the grasping level of the participants, interest and development of skills. This approach concentrated on assessing the Key Resource Persons (KRPs) according to their peer feedback, their active involvement in group projects, and their proficiency with the ICT tools and gadgets that the Resource Persons suggested. Numerous competitions were organised among the state-wise KRPs related to scale, toposheets, map projection, weather instruments, data analysis, remote sensing and GIS based learning process. This approach gave a comprehensive picture of the KRPs' development over the training program by combining several evaluation formats to guarantee that both individual and group learning were evaluated. Peer feedback encouraged participants to support one another's growth and further promoted a culture of constructive criticism and peer learning. At last, but not least a post-test also conducted before the valedictory session to assess the attaining knowledge during the insightful lectures through thus programme.

Valedictory session

The valedictory session of the five-day capacity-building program was a moment of celebration and reflection, marked by the presence of distinguished dignitaries. Prof. I. B. Chughtai, In charge Principal of RIE-NCERT, Bhopal, graced the occasion, alongside Prof. Chitra Singh, Head of DEE, and Dr. Suresh Kumar Makwana, Head DESSH. In his concluding remarks, Prof. Mandal congratulated all the Key Resource Persons (KRPs) for their successful completion of the training and emphasized the importance of translating the acquired knowledge and skills into impactful classroom practices that benefit students. He said he hoped the training would result in significant improvements to the teaching-learning process, which would ultimately give students a better educational experience. Prof. Chitra Singh also lauded the efforts of the KRPs and the program coordinators for their dedication to making the training program a resounding success. She wished the KRPs well and urged them to make meaningful contributions to the educational ecosystem and successfully apply what they had learned. Dr. Suresh Kumar Makwana further inspired the KRPs by urging them to continue determined for brilliance as they return to their respective schools. His words served as a motivational and inspirational call to action, reminding participants of the responsibility they bear in nurturing young minds. The session was chaired by Dr. Alka

Singh, who guided the proceedings with grace, and concluded with a heartfelt vote of thanks by Dr. Soyhunlo Sebu. The KRPs, in turn, expressed their gratitude and happiness for the opportunity to be a part of the comprehensive training program, highlighting its enriching and transformative impact. This valedictory session stood as a testament to the collective commitment of educators and leaders to advance the quality of education, setting the stage for sustained growth and innovation in teaching practices.

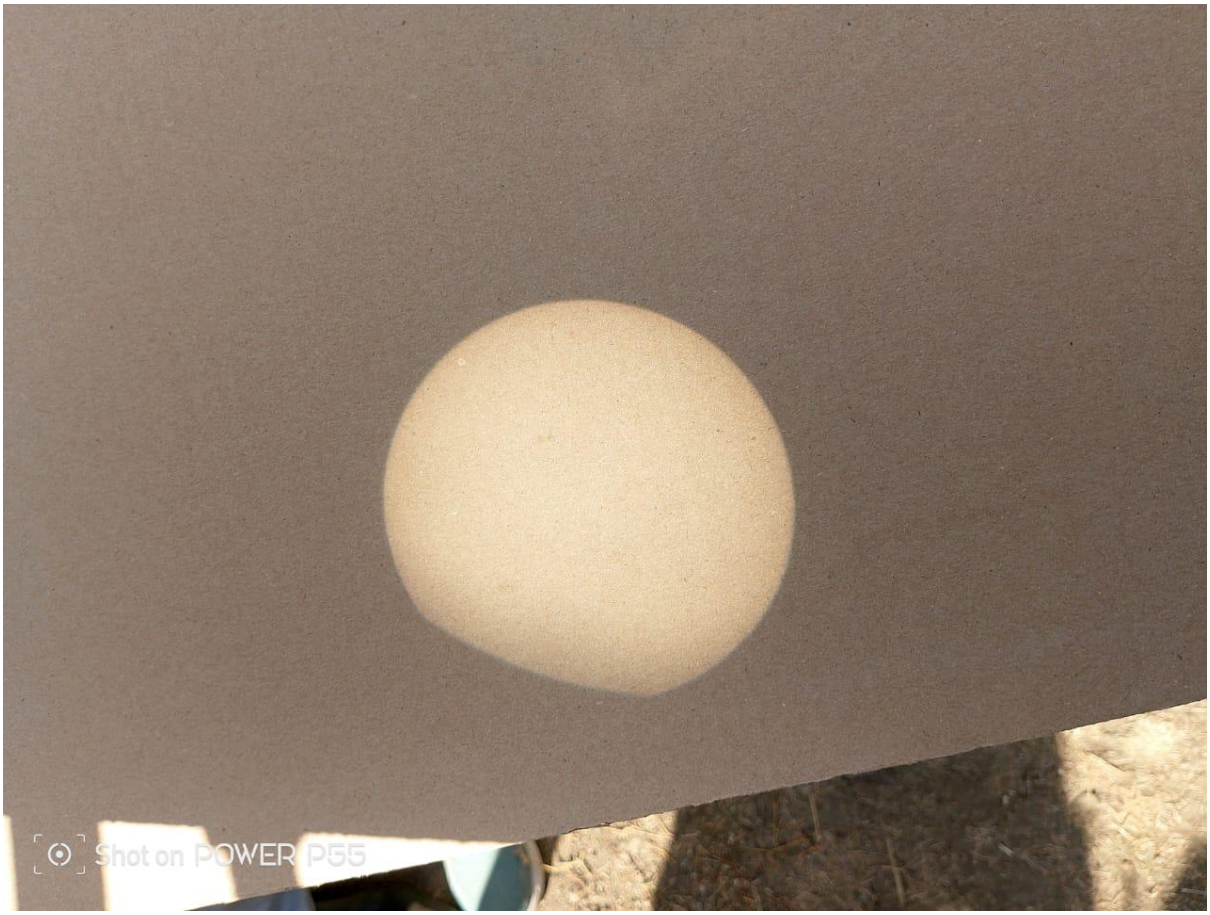
SR	NAME	SCHOOLNAME	CONTACT	STATE
1	BHOOPENDRA YADAV	GMHSS	9630175086	M.P
2	ASHADU LAL UIKEY	GHSS MEHRA	9584257963	M.P
3	SHEKHAR PRASAD SAO	GHSS	9098125601	C.G
4	PURANDAR PATEL	SRBGHSS	8770938190	C.G.
5	MAHABIR PRASAD CHANDRA	SAUHMV	7987571128	C.G
6	RAMSINGH PATEL	GHSS	7000824292	C.G
7	VIKAS NARAYANRAO CHAVAN	JHSS	9404547474	M.H
8	NARESHKUMAR SANKHAT	NPHS	9426052179	G.J
9	JAYESH SOLANKI	LATE V.P.Z. SCHOOL	9714311233	G.J
10	SUDHIR KESARKAR	SSAHSS	9764244724	GOA
11	PANDURANG PEDNEKAR	HPSS	7875912107	GOA
12	RAKESH KUMAR BARMA	GGHSS	9926082524	M.P
13	BABULAL PATEL	GHSS	9893400139	M.P
14	KUNAL ZOTING	RJC	8956552609	M.H

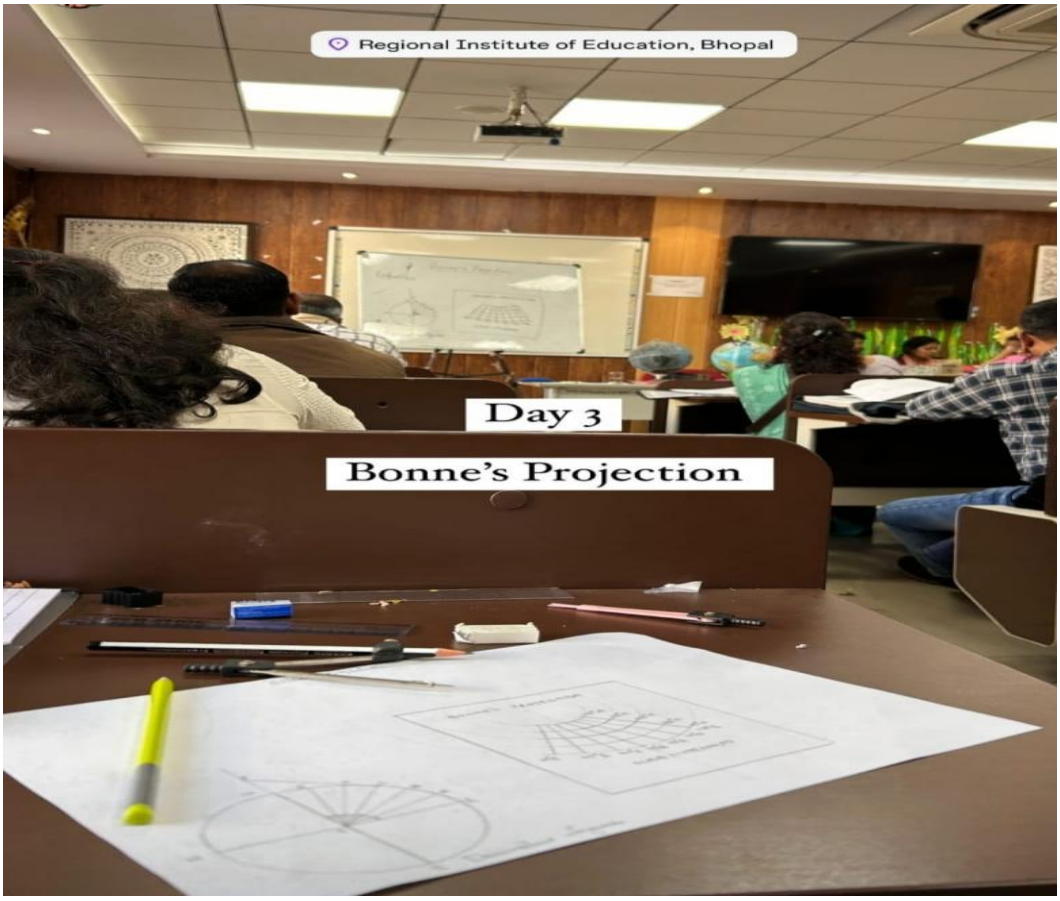
15	PRANIT DESHMUKH	GSTC	8275396049	M.H
16	JAGRUTI MAHAJAN	PUNE	7028017775	M.H
17	KHUSHBU GHODA	KES JR COLLEGE MUMBAI	9833005429	M.H
18	BHAGYASHRI NAIK	GHSS	7507437250	GOA
19	SHLOKA S MOKHARDKAR	CUNCOLIM UNITED HS	9922359163	GOA
20	VINITA PAWAR	DHSS	7517695645	GOA
21	SHAULAKSHI GAUNKER	SMHSS	8698450748	GOA
22	BHAVNA PANDAB	GHSS	8962338200	C.G
23	TULENDRA SAGAR	GHSS	7697337745	C.G
24	KAMLESHWAR SINGH RAJPUT	GGHSS	7697832738	C.G
25	RAMKRISHNA PATIL	PAJCOLLEGE	8329113141	M.H
26	MANOJ DESHMUKH	R J COLLEGE	9421680541	M.H
27	LAKSHMINARAYAN MANDHATA	GHSS	8435074395	M.P
28	VASOYA PRAKASH	MODEL SCHOOL	9724435724	G.J
29	LABANA RAKESH	SJHS	9726088391	GJ
30	MAHENDRA PATHAK	GHSS	9727725512	GJ
31	PATEL JAGDISHKUMAR	HRJS	9428752528	GJ
32	ANITA GAUTAM	EFAGHS	9630627185	MP
33	VIKAS VERMA	DEO	8811089162	CG

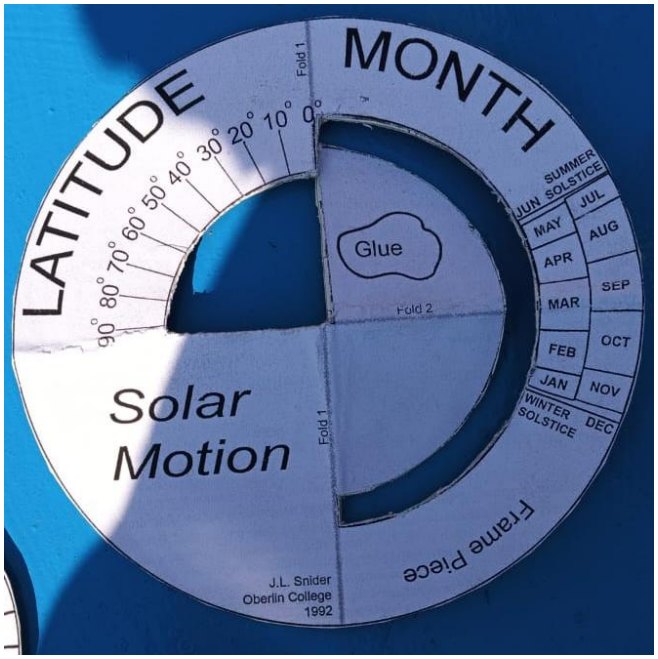
34	MAHENDRA SAMRITE	CMRISE	8827644845	M.P
35	SAHDEV BARLE	SAUHS	7000508571	C.G
36	SHWETA SONI	GHSS	7987627717	M.P
37	SHOBHA MALAKAR	SVGHSS	9926314775	M.P
38	DHAYGUDE ADINATH	M.V SCHOOL	9405130100	M.H
39	RAJENDRAPRASAD NAMDEV	GHSS BIJAVAR	7389656664	M.P

Images of Programme


Concave Slope


Shot on POWER P55


Regional Institute of Education, Bhopal
Day 3
Bonne's Projection


LATITUDE
MONTH
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0°
10°
20°
30°
40°
50°
60°
70°
80°
90°
Glue
Fold 2
Solar Motion
Fold 1
Frame Piece
SUMMER SOLSTICE
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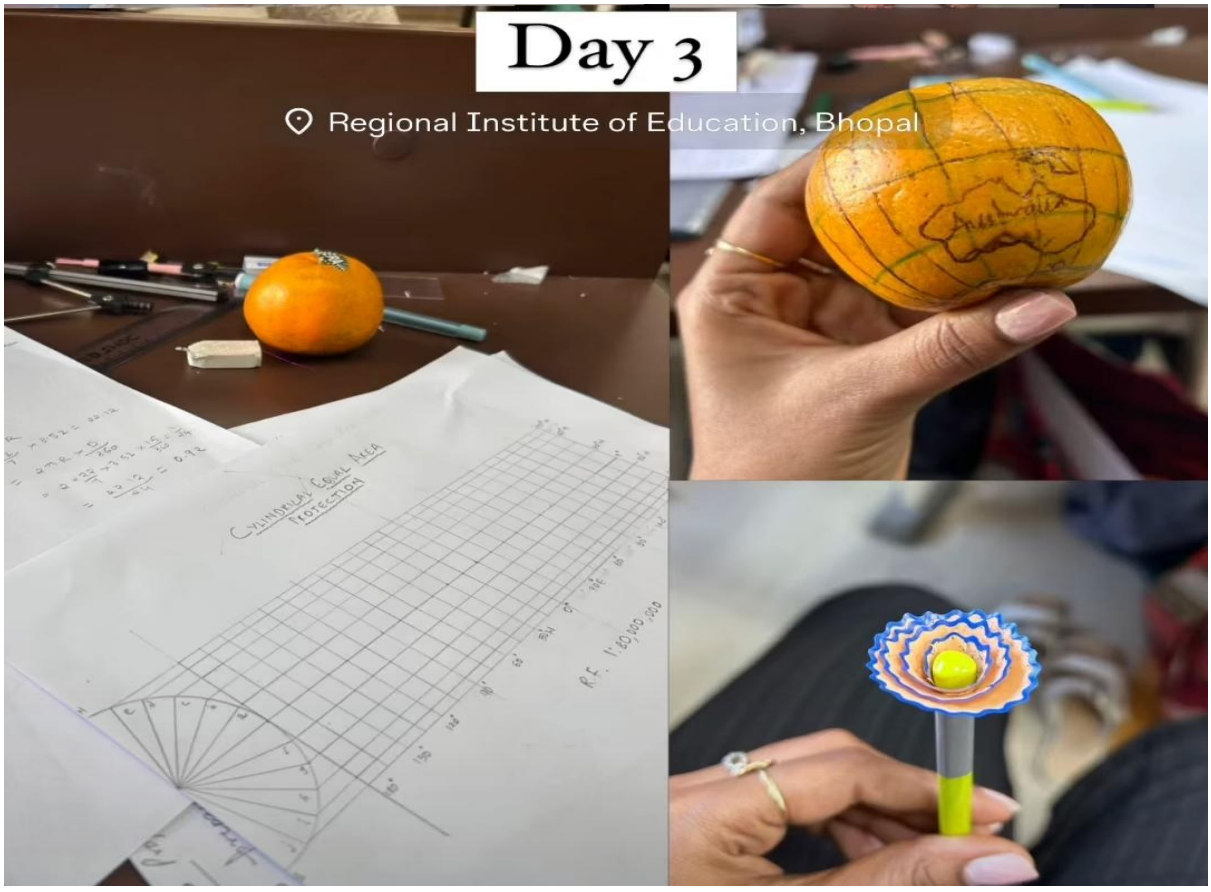
J.L. Snider
Oberlin College
1992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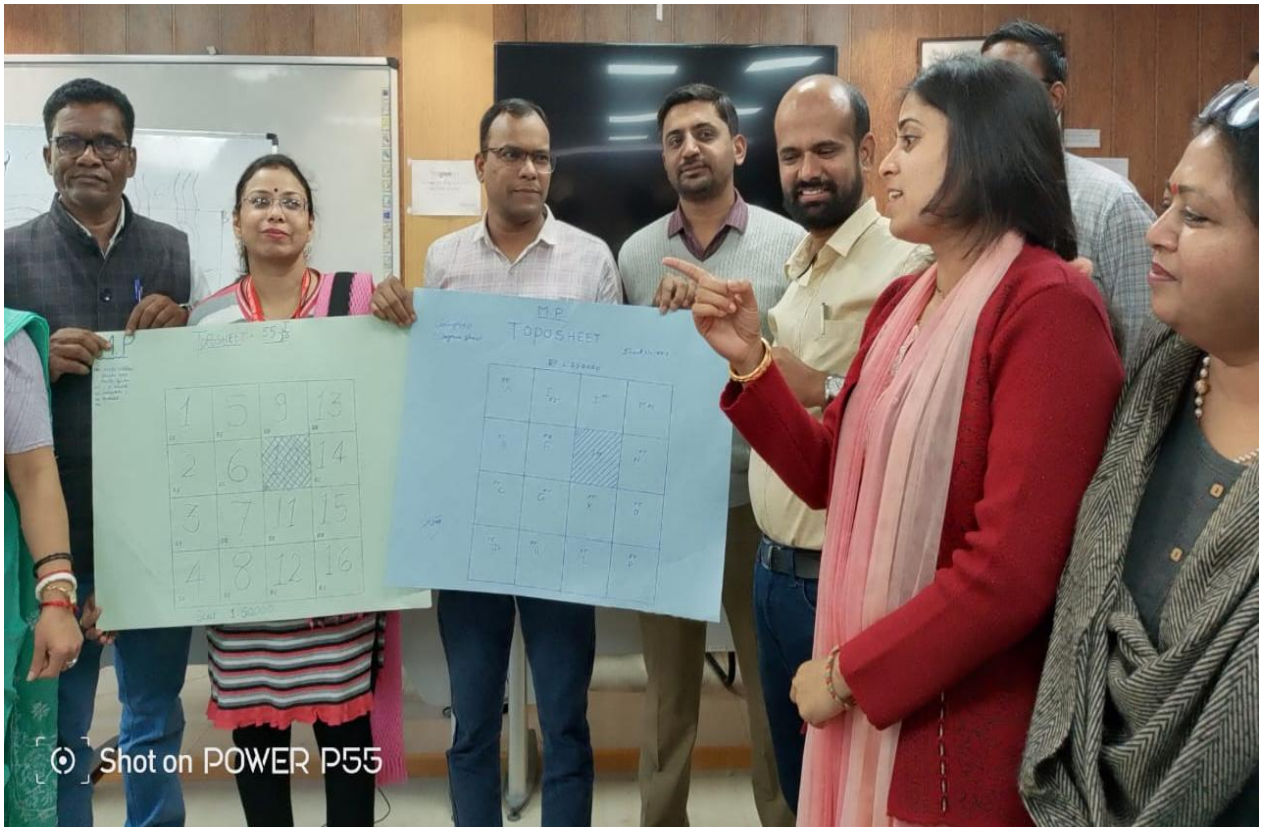
TOPOSHEET
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