REPORT

IIT GANDHINAGAR

20th AUG 2024 TO 24th

DAY 1 (20/08/24)

Session -1: Conducted by Mr. Abhijit Das

Introduction and Ice Breaking: Punched Cards; String Art, Math Salute

The session began with an introduction to CCL, IIT Gandhinagar, highlighting some of their projects, including collaborations with Kasturba Gandhi schools. Mr. Abhijit led the session with great enthusiasm and a touch of humour, which helped make the participants feel comfortable and fully engaged.

The activity of crafting a story of the participants' journey using punched cards captured everyone's interest. During the process, the concept and application of the binary number system were explored in a playful manner. The participants created the story themselves in small groups.

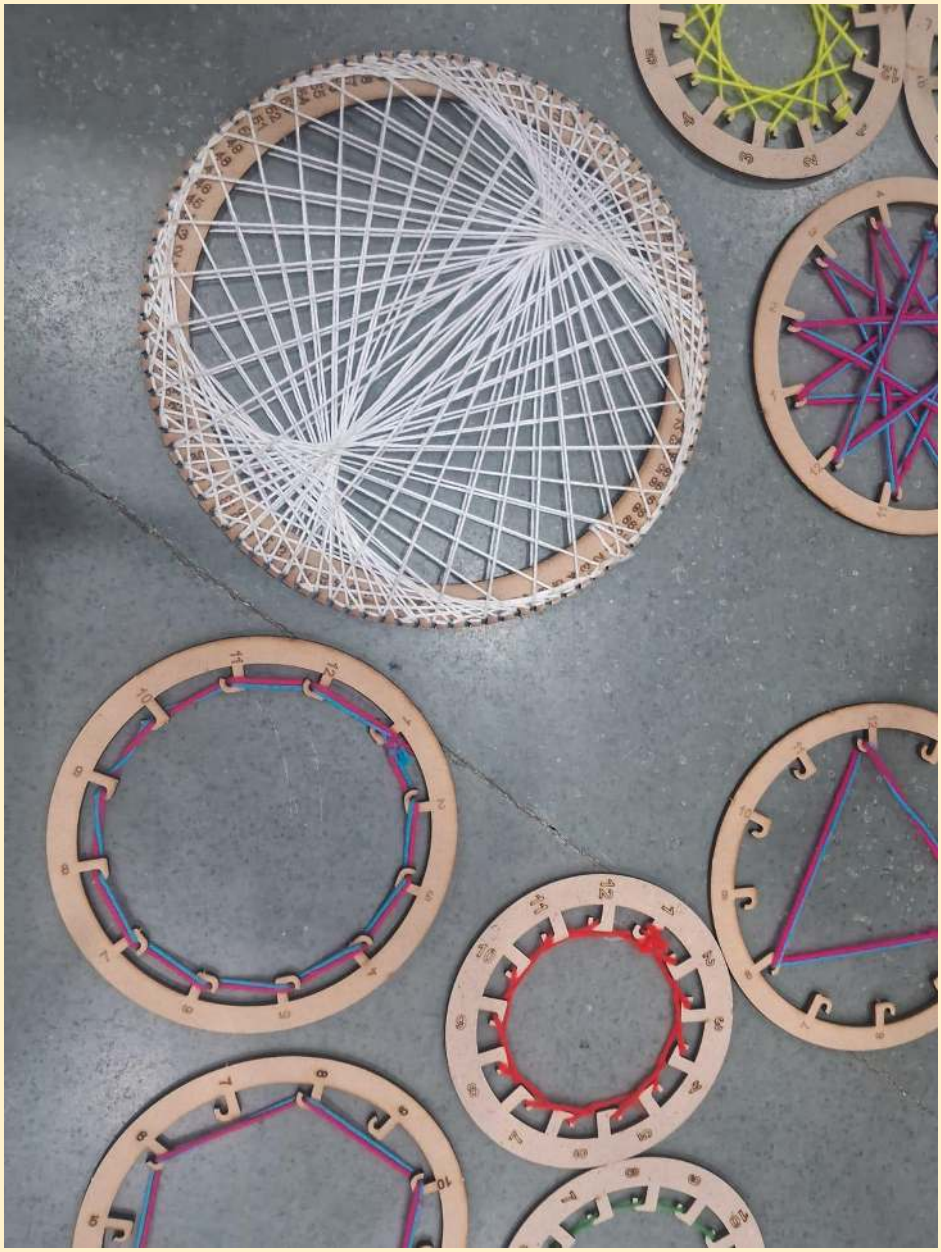
Various other concepts, such as multiples (tables) of 2, 3….etc, were visualized through string art. Participants were amazed by this approach and expressed their curiosity.

Session -2: Conducted by Mr. Manish Jain

Creative Learning Approach & Objective of the Workshop

Manish sir shared in detail The Creative Learning Approach & Objective of the Workshop. The vision and mission of CCL. The Centre for Creative Learning (CCL) at IIT Gandhinagar is a pioneering initiative aimed at fostering creativity, innovation, and hands-on learning in education. Established with the vision of transforming traditional teaching methods and understanding of concepts of Mathematics and Science, CCL focuses on experiential learning through projects, Models, Games, experiments, and creative problem-solving. It serves as a hub to explore new ways of thinking and teaching, particularly in science, technology, engineering, and mathematics. By integrating creativity with rigorous academic concepts, CCL empowers learners to think critically, innovate, and approach problems with curiosity and imagination. Some points of discussion with Manish Sir-

- If students get worth for their time their attendance can be 100% without check.
- Teach for liking.
- How malnutrition affects cognitive ability and growth of children (stunted cognition problem)
- His experiences of various visits to educational institutions.
- In dept concepts of Mathematics such as – (a)divisibility rules (why and how) and how they can be simplified for children by using division of rupees in 2,3 …. Equal parts.(b) “what and how” if division starts from right hand side instead of left hand side etc.



Session -3: Conducted by Mr. Abhijit Das

3D Shape Visualisation using Kheera

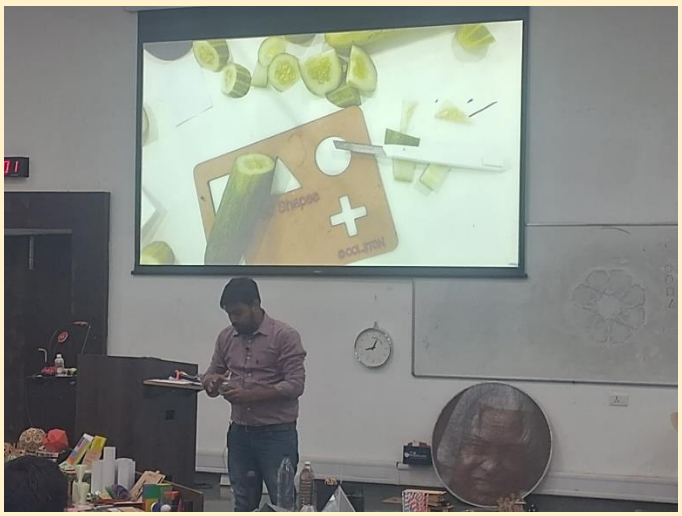
Math in vegitables-

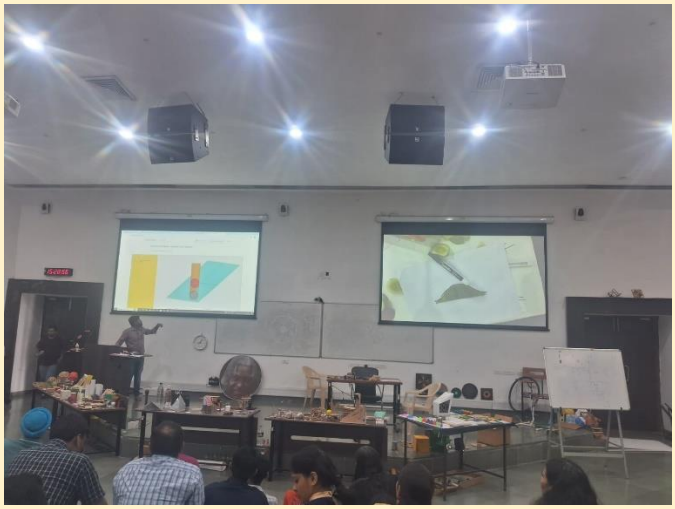
A workshop on 3D shapes visualization using kheera (cucumber) was conducted for math teachers to enhance their teaching techniques. The session focused on demonstrating how everyday objects like cucumbers can be used to teach 3D geometric concepts, such as cylinders, cones, and spheres. Discussion on identifying shapes in cutting of vegetables was interesting. Teachers learned practical, hands-on methods to help students visualize and understand these shapes better. The interactive activities allowed participants to slice and model cucumbers, exploring cross-sections and dimensions. The workshop emphasized creativity in teaching and was well-received, with teachers expressing enthusiasm for applying these techniques in their classrooms. Some other discussions focused on Dandelion sphere, showing 2 foci of ellipse from a cylindrical shape, peeling off the boundaries of ellipse (made of kheera) to get a sine wave.

Such daily life objects can be used as TLM and students can become comfortable in abstract imagination of top, side and front view.

Then we discussed how light travels through circles of different sizes and how to use it to create **grey scale pictures**.

It got connected with the concept of areas of different countries in a Map (ex. – India and Greenland) (used “map to scale” website)



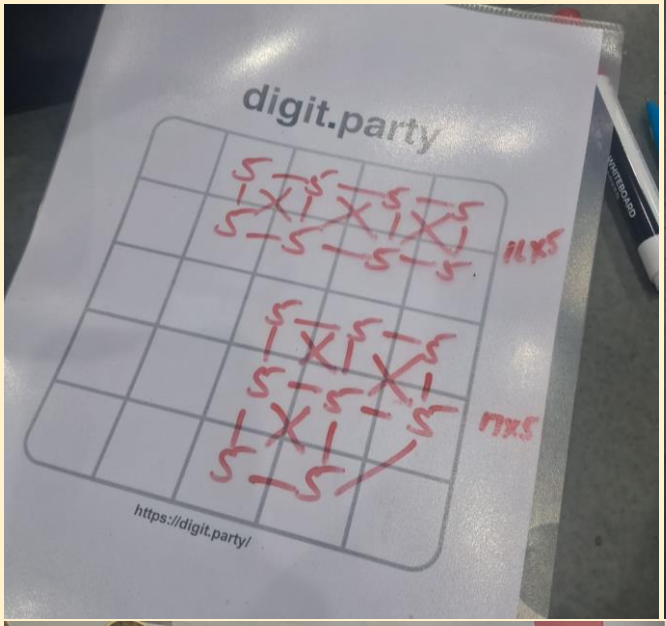


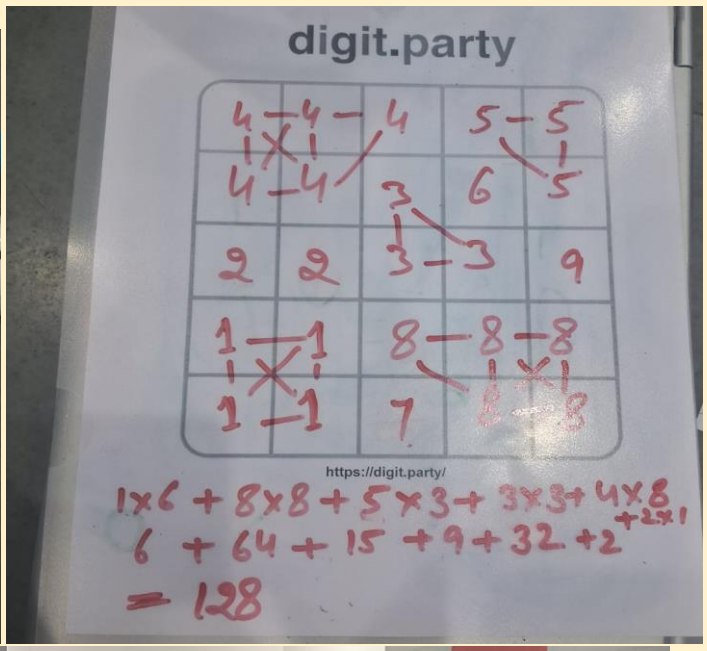
Session -4: Conducted by Ms. Jyothi Krishnan

Digit Party (Board Game)

Ms. Jyothi shared some of amazing games and how these games can make learning interesting. All the participants enjoyed and experienced the fun of new learning.

Digit party a game for arrangement of numbers can be played by students. They can experience not only fun but also develop many other skills such as planning, visualization, arranging in best possible way according to rules, dealing with numbers etc.


digit.party
https://digit.party/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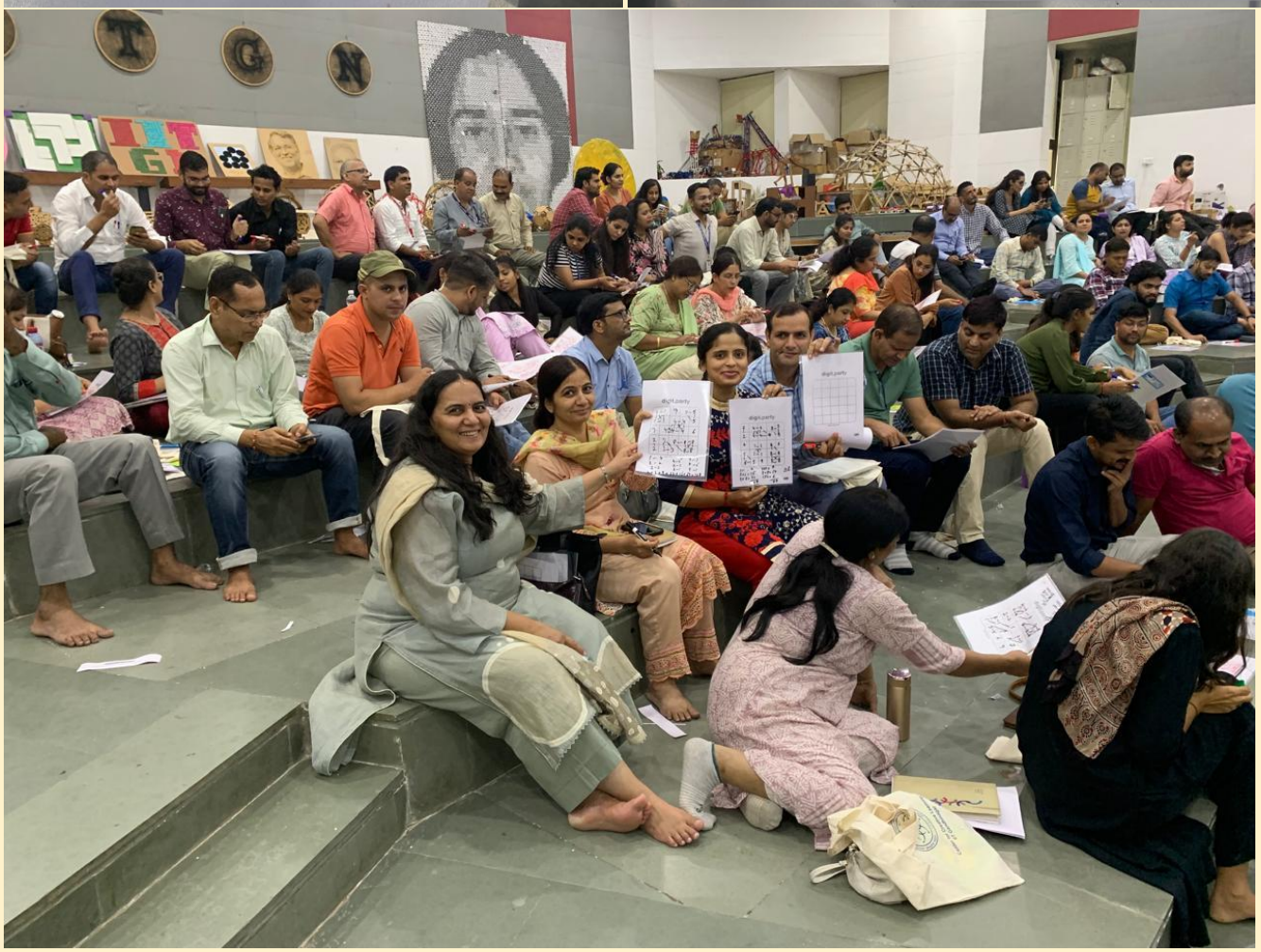
1x6 + 8x8 + 5x3 + 3x3 + 4x8 +2x1
6 + 64 + 15 + 9 + 32 + 2
= 128



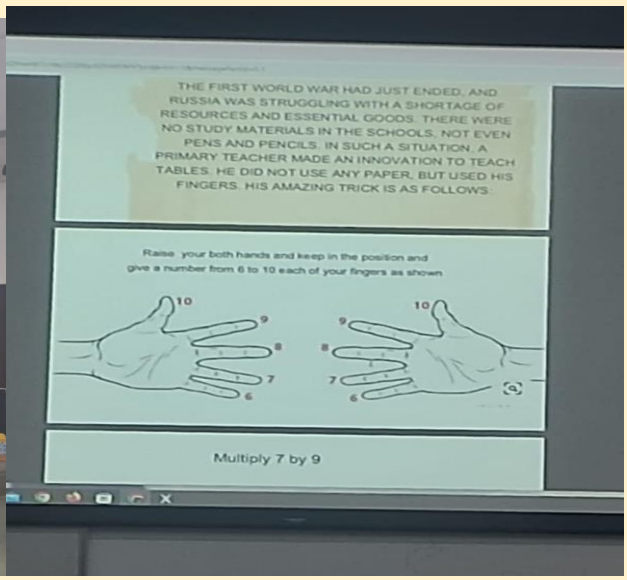

digit.party

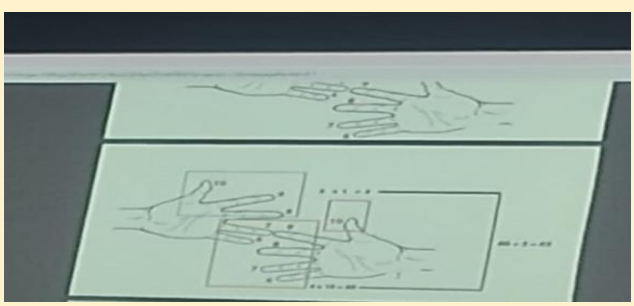
DAY-2

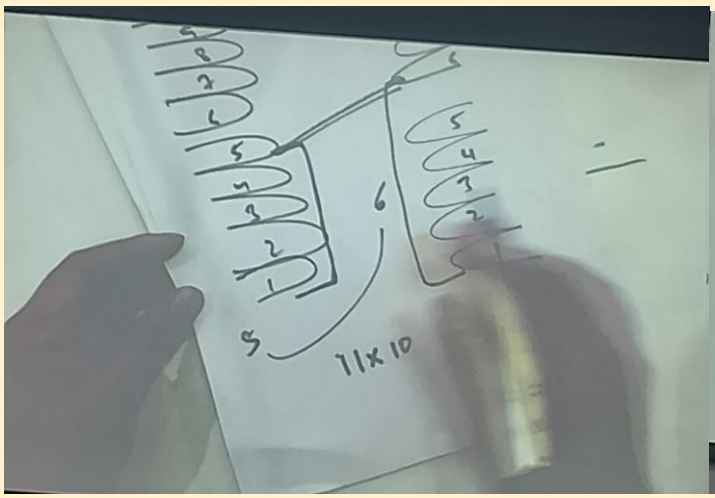
Session 1: Conducted by Mr. Bijender

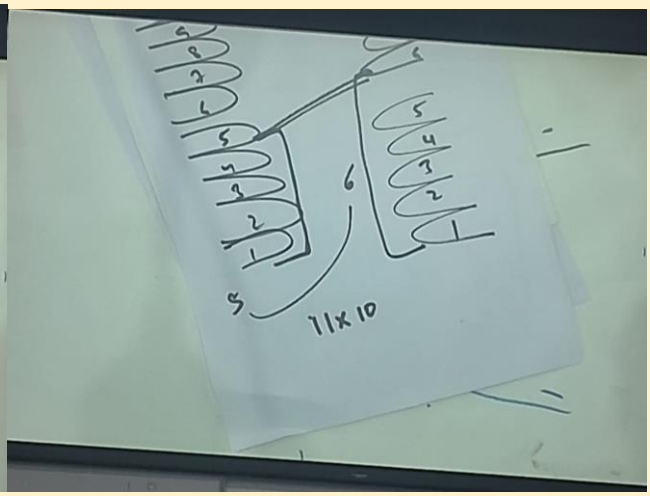
Finger Multiplication

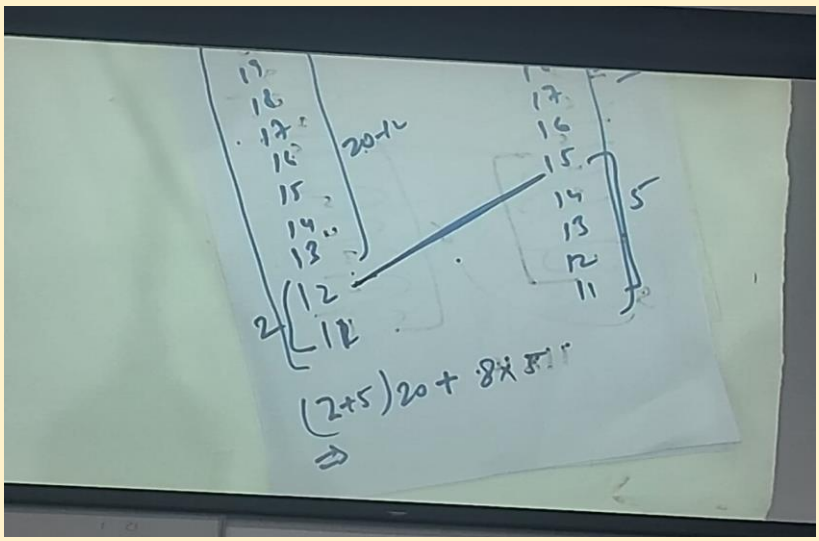
Mr. Bijender shared his research and findings on "Finger Multiplication" with us. Everyone participated enthusiastically and showed interest in learning about his discoveries, leading to extensive discussions and brainstorming session. He also left the concept open ended to be explored by participants for higher numbers.

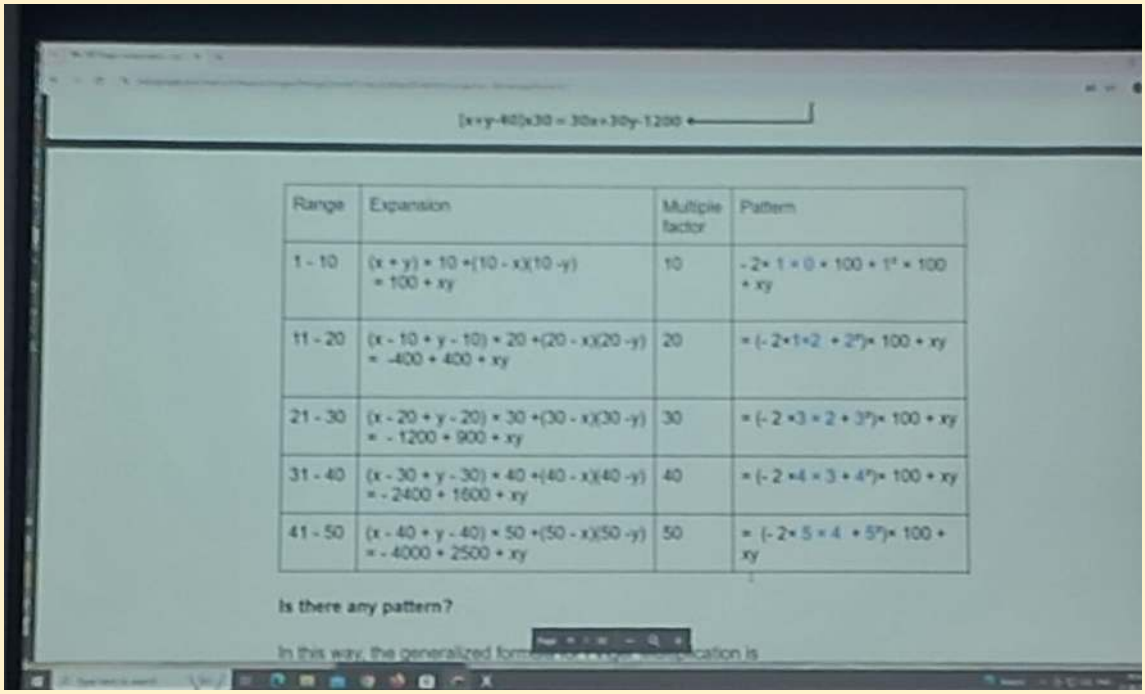












$[x+y-40)x30 = 30x+30y-1200$

Range	Expansion	Multiple factor	Pattern
1 - 10	(x + y) * 10 +(10 - x)(10 -y) = 100 + xy	10	- 2* 1 * 0 + 100 + 1^2 * 100 + xy
11 - 20	(x - 10 + y - 10) * 20 +(20 - x)(20 -y) = -400 + 400 + xy	20	= (- 2*1+2 + 2^2)* 100 + xy
21 - 30	(x - 20 + y - 20) * 30 +(30 - x)(30 -y) = - 1200 + 900 + xy	30	= (- 2 *3 + 2 + 3^2)* 100 + xy
31 - 40	(x - 30 + y - 30) * 40 +(40 - x)(40 -y) = - 2400 + 1600 + xy	40	= (- 2 *4 + 3 + 4^2)* 100 + xy
41 - 50	(x - 40 + y - 40) * 50 +(50 - x)(50 -y) = - 4000 + 2500 + xy	50	= (- 2* 5 + 4 + 5^2)* 100 + xy

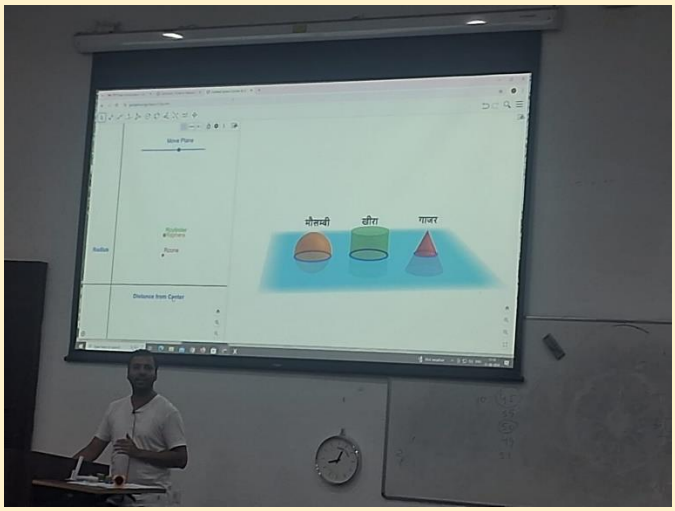
Is there any pattern?

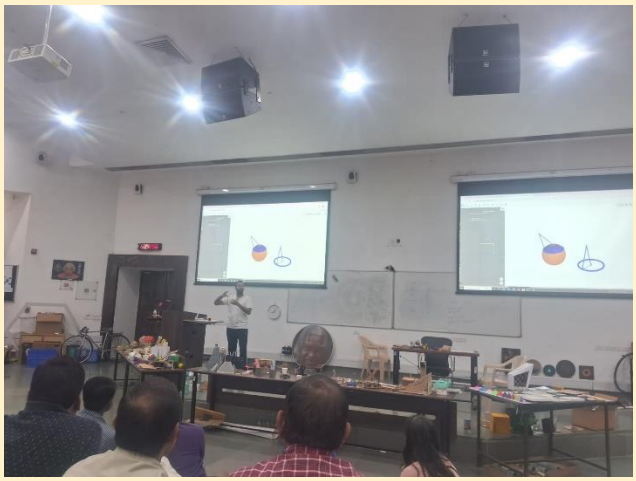
In this way, the generalized form [illegible]cation is

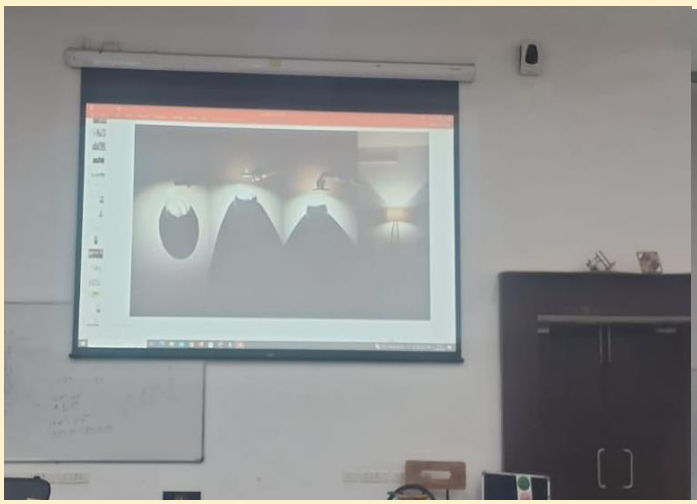
Session 2: Conducted by Mr. Jay Thakkar

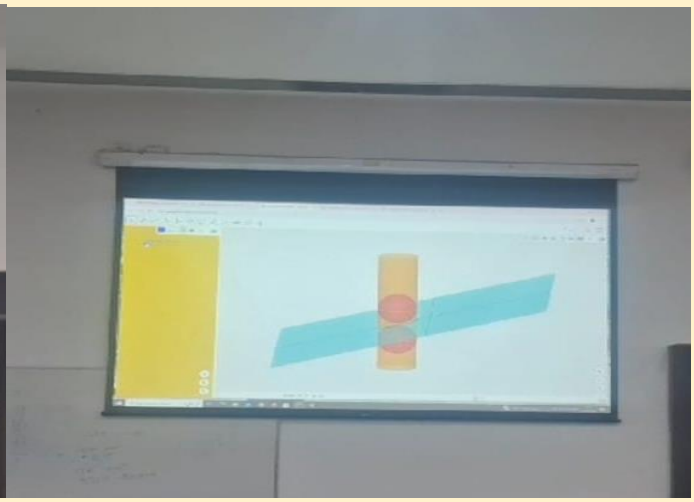
3D Visualisation

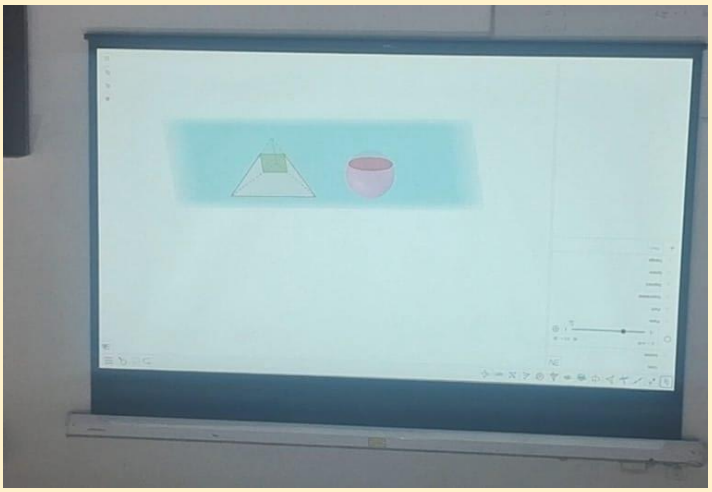
Mr. Jay Thakkar skilfully utilized technology, including GeoGebra and light with a ball, to demonstrate **conic sections and their relationships.** The concept of **three body problem** was introduced. The moving **GeoGebra video templates** were thoughtfully designed to simplify the explanations, captivating everyone and keeping their focus on the concepts. Also, the area of cross-section was discussed. Manish sir also explained some of the working models based on latest research. An assignment was given which was well attempted by all the participants.







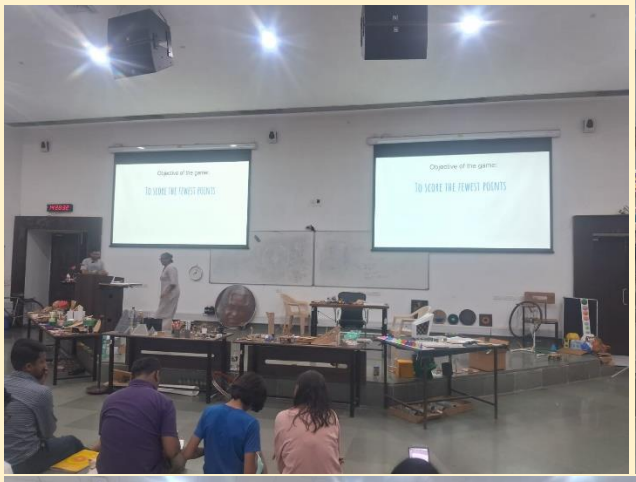




Session 3: Conducted by Ms. Jyothi Krishnan

No Thanks (game)

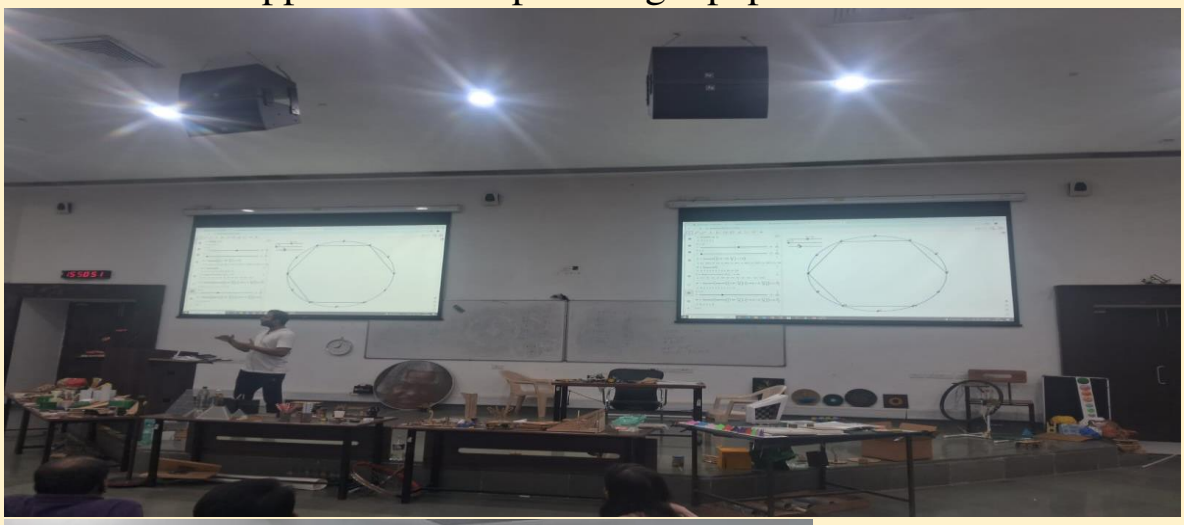
Ms. Jyothi made the participant paly another game “No Thanks”. It was again a very useful game which our students can play and develop good understanding as well as planning and decision making while learning Math with fun. Also they discussed how the string patterns are formed and the trick/principle behind it.

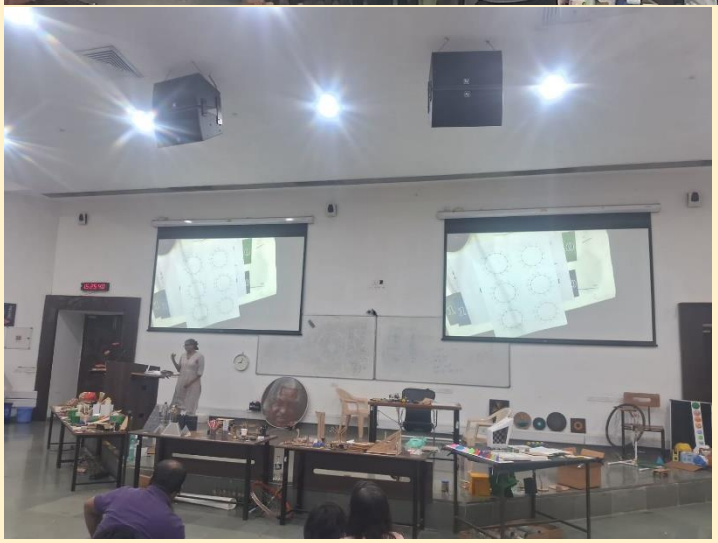


Session 4: Conducted by Mr. Jay Thakkar

Paper Folding & Cutting

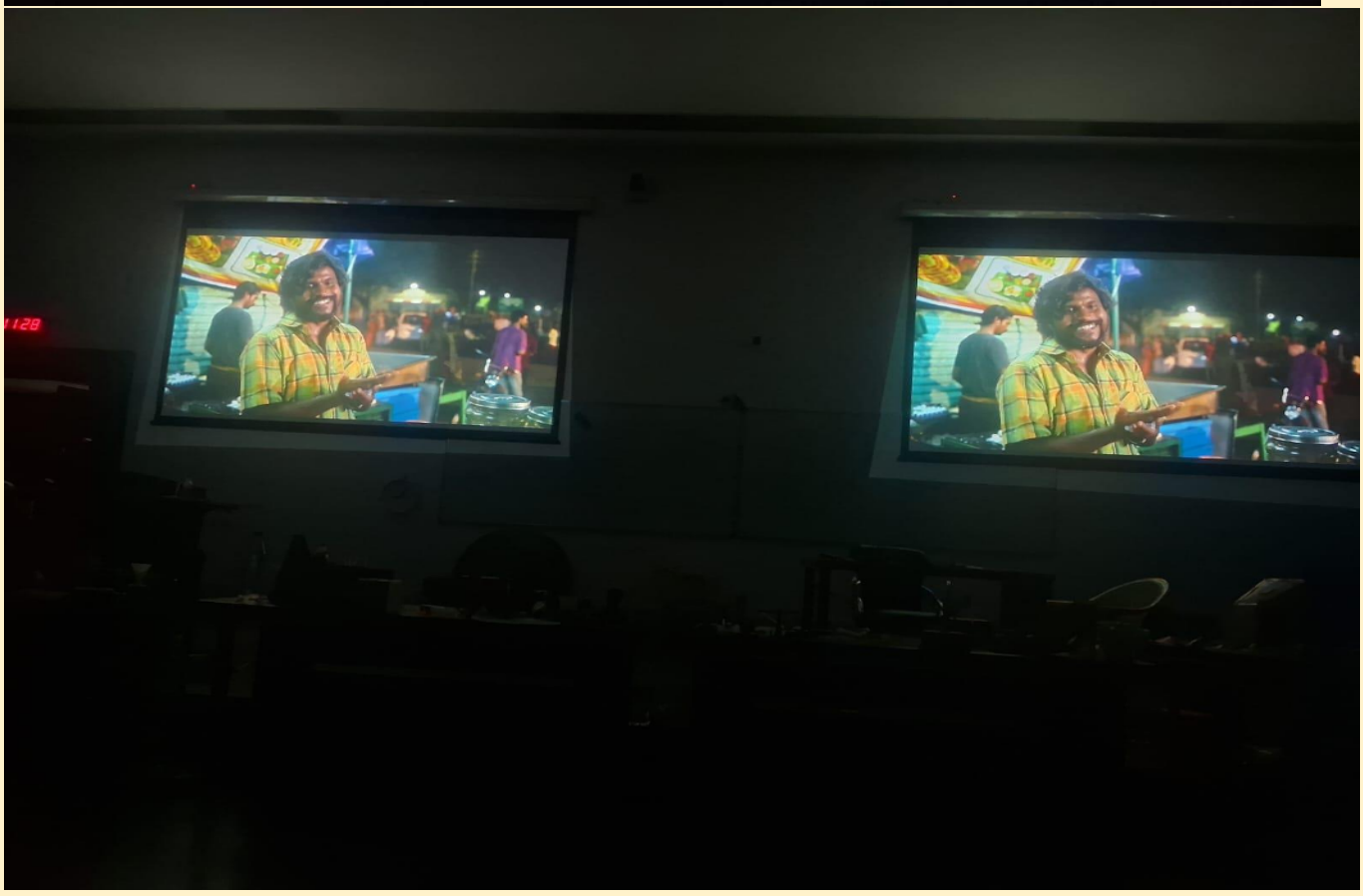
This session was conducted by Mr. Jay who discussed the importance, methods and skills of paper folding and how it can be used for experiential learning in our Classes. A lot of information related to paper and its utilization was shared such as what will happen if we keep folding a paper in half and about **Golden Ratio**.





Movie time-

In the evening a movie was shown. It was a movie based on team work and collaboration.



DAY-3 (22/08/24)

Morning Session: Conducted by Mr. Vikram Singh

Nature Walk

- Early morning the third day we all gathered in the park and went for "Nature Walk" as Mr. Vikram explained many new and amazing facts about nature, trees, insects and birds. He showed some preserved specimens of different types of bees, insects and explained the role of evolution. Some more topics discussed are-
- About Leaf miner-Papadi
- Leave cutter bee-Amaltas(C shape cutting on leaves)-
- Solitary bees 20-22000 Bees.
- 2-3 types of Bees are solitary. Green beans (carpenter bee) make hoke in tree soft branch. (Feb to April month lots of activities)- Gulmohar tree
- Nest of wasp/honeybee. Storage of honey as a food by honey bees.
- Both side holes in the nest by honey bees and its reason.
- Wasp makes new house yearly. Only queen survives. Etc.


BACK
TO
NATURE


BACK
TO
NATURE


India
IIT Gandhinagar
13.1.2024
V. Singh

Session 1: Conducted by Mr. Manish Jain

General Discussion and Science Interaction

Manish Sir shared his enriching experiences of various workshops he has conducted and the importance of experiential learning. He emphasized use of multiple senses in Teaching-learning and therefore specifically shared some important strategies, models, games, concepts, papercutting logics and tricks and many more such as-

- Logics of judging distances, straight or along triangle.
- Deep and detailed discussion on fractions and percentage with example such as how manipulative is the % of wheat written on packets.
- Methods Singapore uses in teaching -learning of Math.
- Reverse engineering.
- How different concepts can be experienced through paper- folding such as perpendicular bisector of equilateral triangle.
- The scientific flaw in the thirsty crow story.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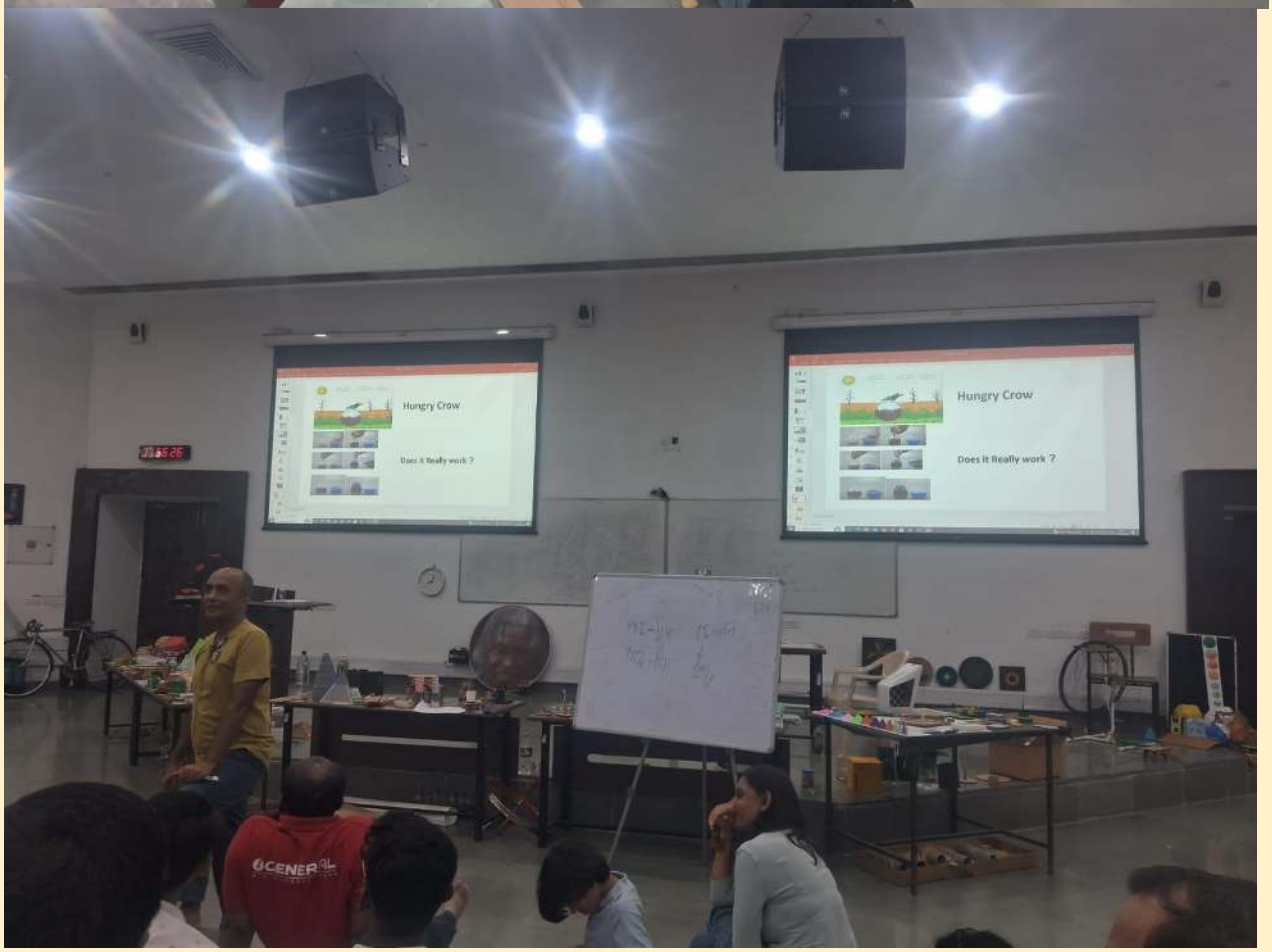
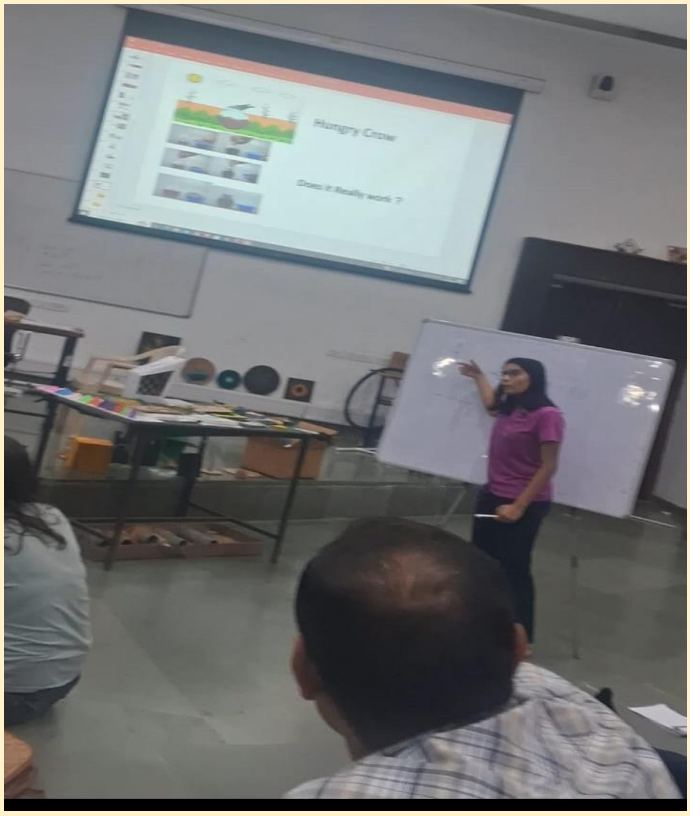
Foundational Literacy and Numeracy
Foundational Literacy and Numeracy

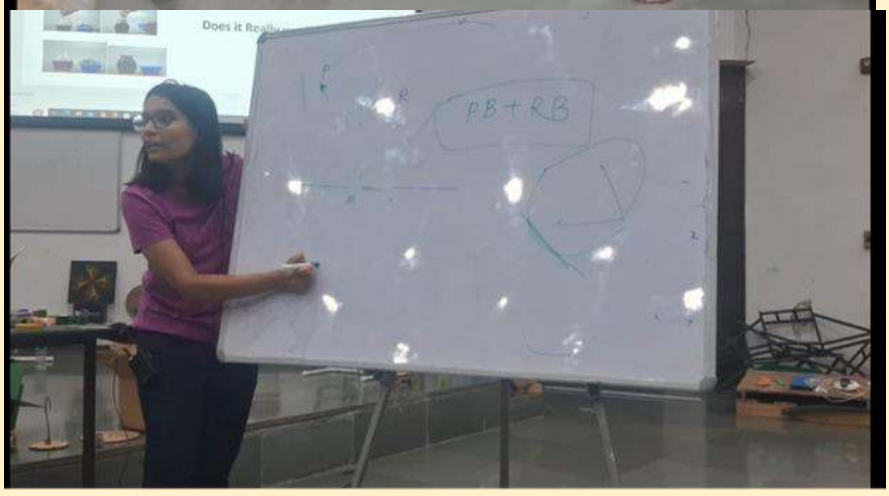

Hungry Crow
Does it Really work ?
Hungry Crow
Does it Really work ?

Session 2: Conducted by Ms. Astha Jain

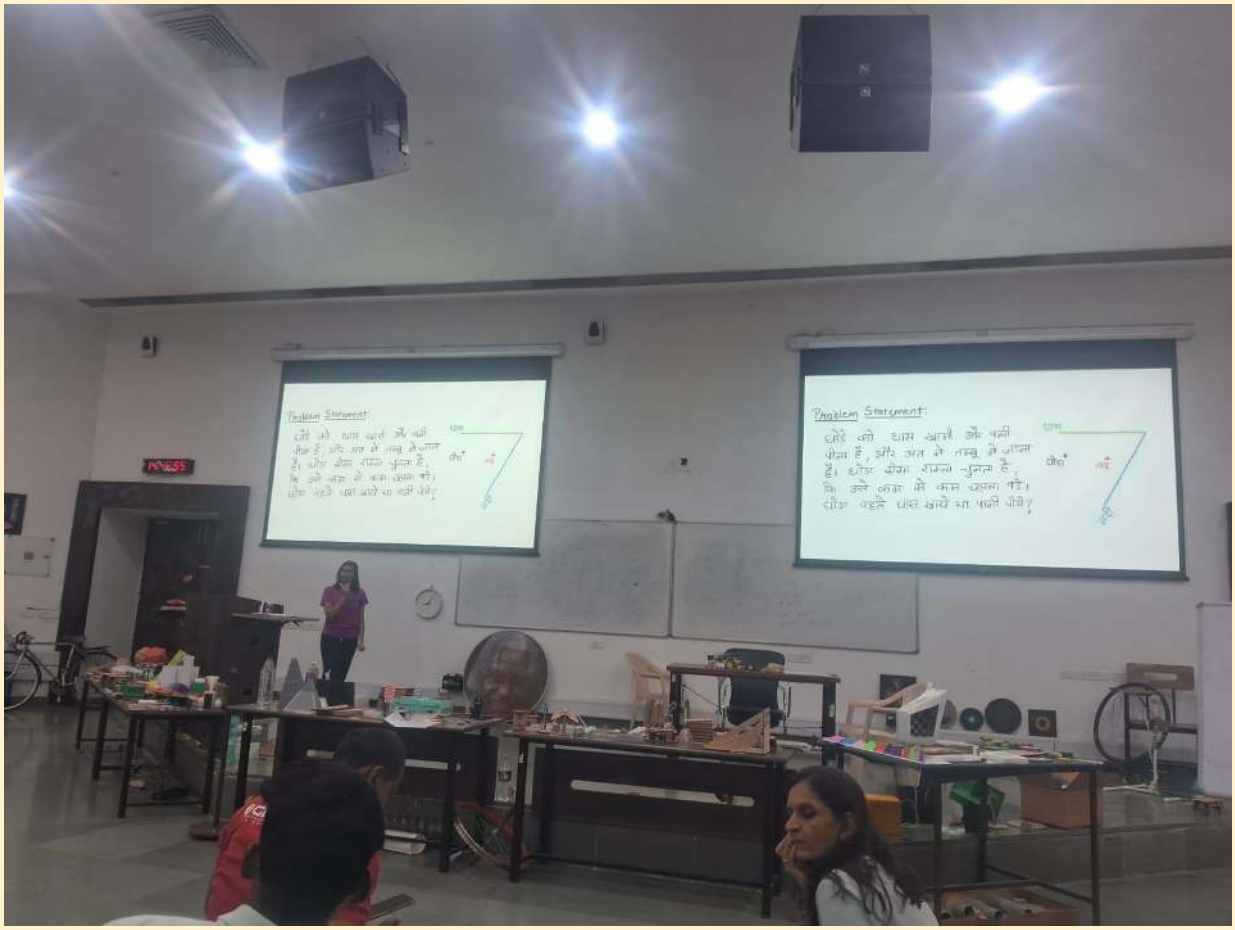
Coin Problem & Shortest Path

Ms. Astha ignited the thought process of all and presented brainstorming activities based on coin problem and shortest path finding. She ensured participation and involvement of all participants. Participants also participated enthusiastically. She presented the activities in “Optimization”. Nature also optimizes. The riddles of heavy tokens and permutations of integral weights (linking it with binary system) were not only engaging but also encouraged complete participation of all. She was full of energy and enthusiasm.


Hungry Crow
Does it Really work ?


PB+RB

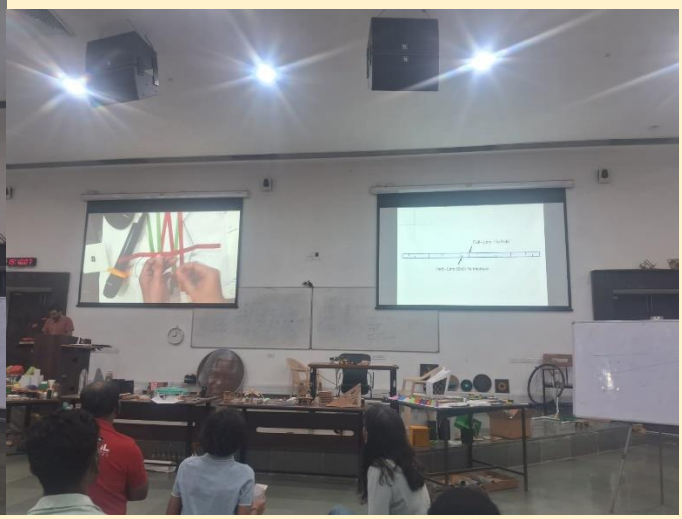

Hungry Crow
Does it Really work ?

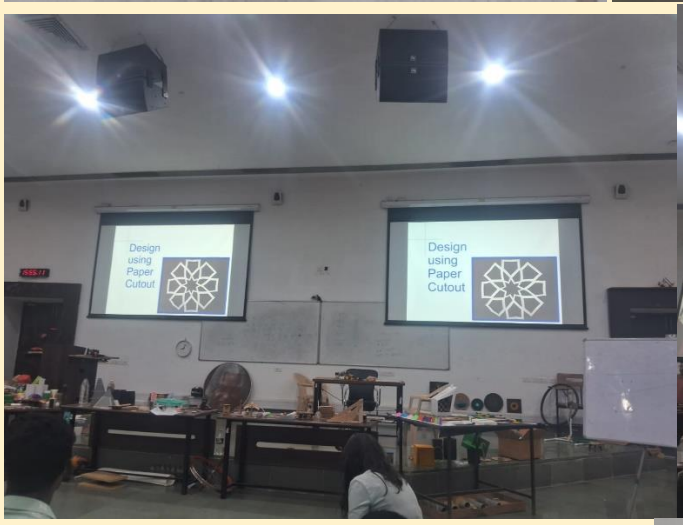

Problem Statement:
Problem Statement:

Session 3: Conducted by Mr. Imroz & Mr. Bijender

Geometry Art

In this session, Mr. Imroz and Mr. Bijender's team awakened the inner child in every participant. They demonstrated how geometric art can make learning math enjoyable, showing how patterns can be created through paper folding and cutting. This approach enhances understanding of abstract concepts and spatial orientation while making learning fun.




Design
using
Paper
Cutout
Design
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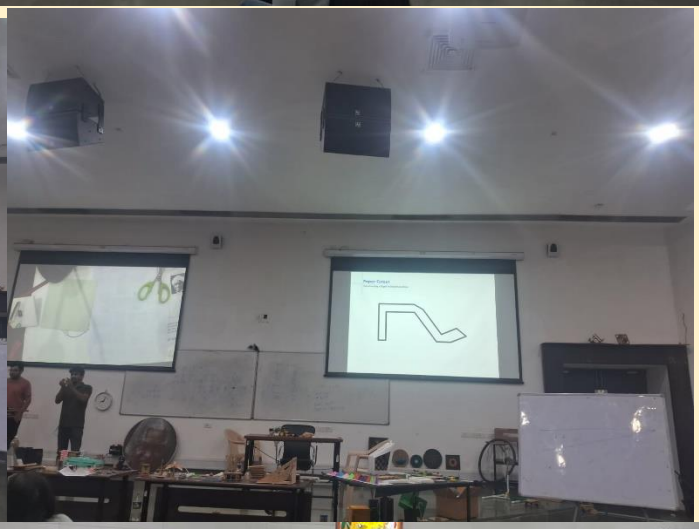

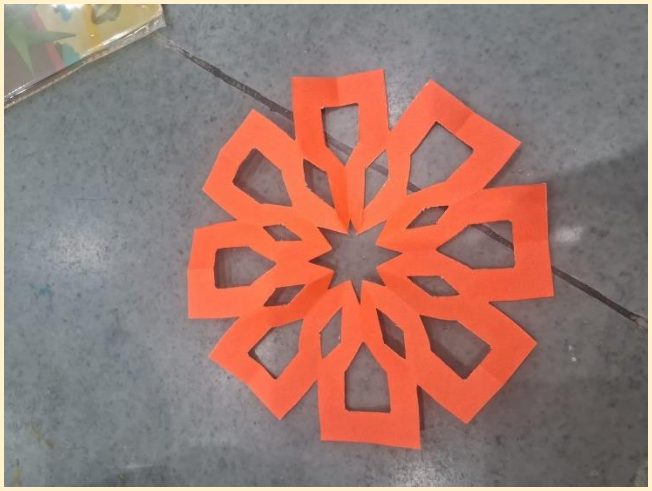


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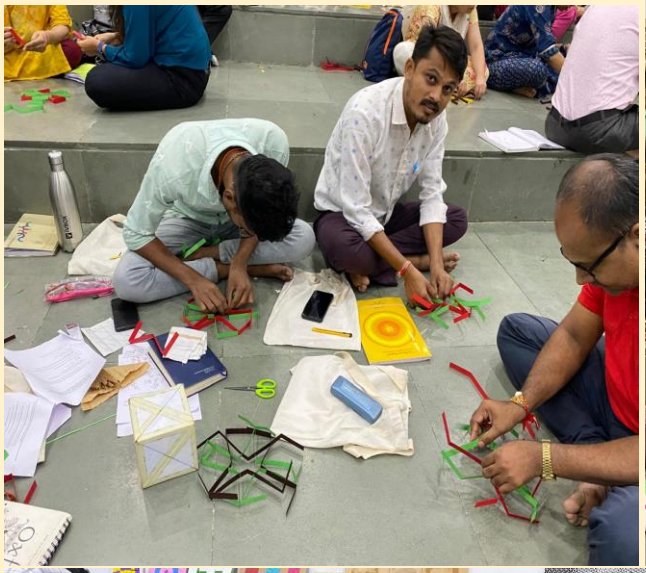
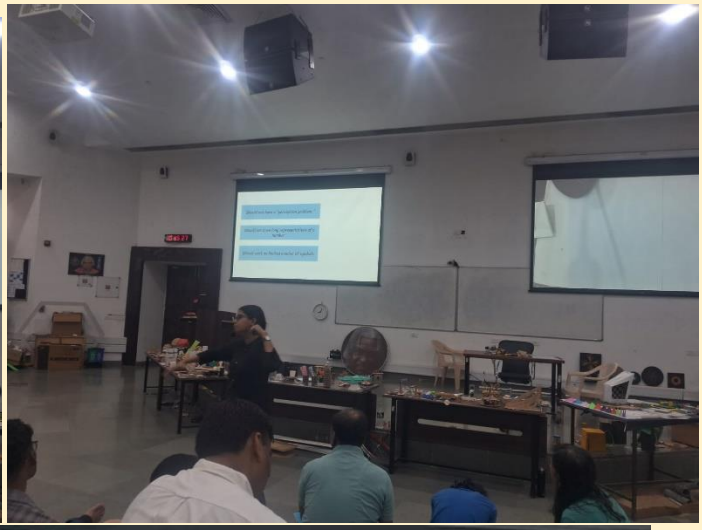


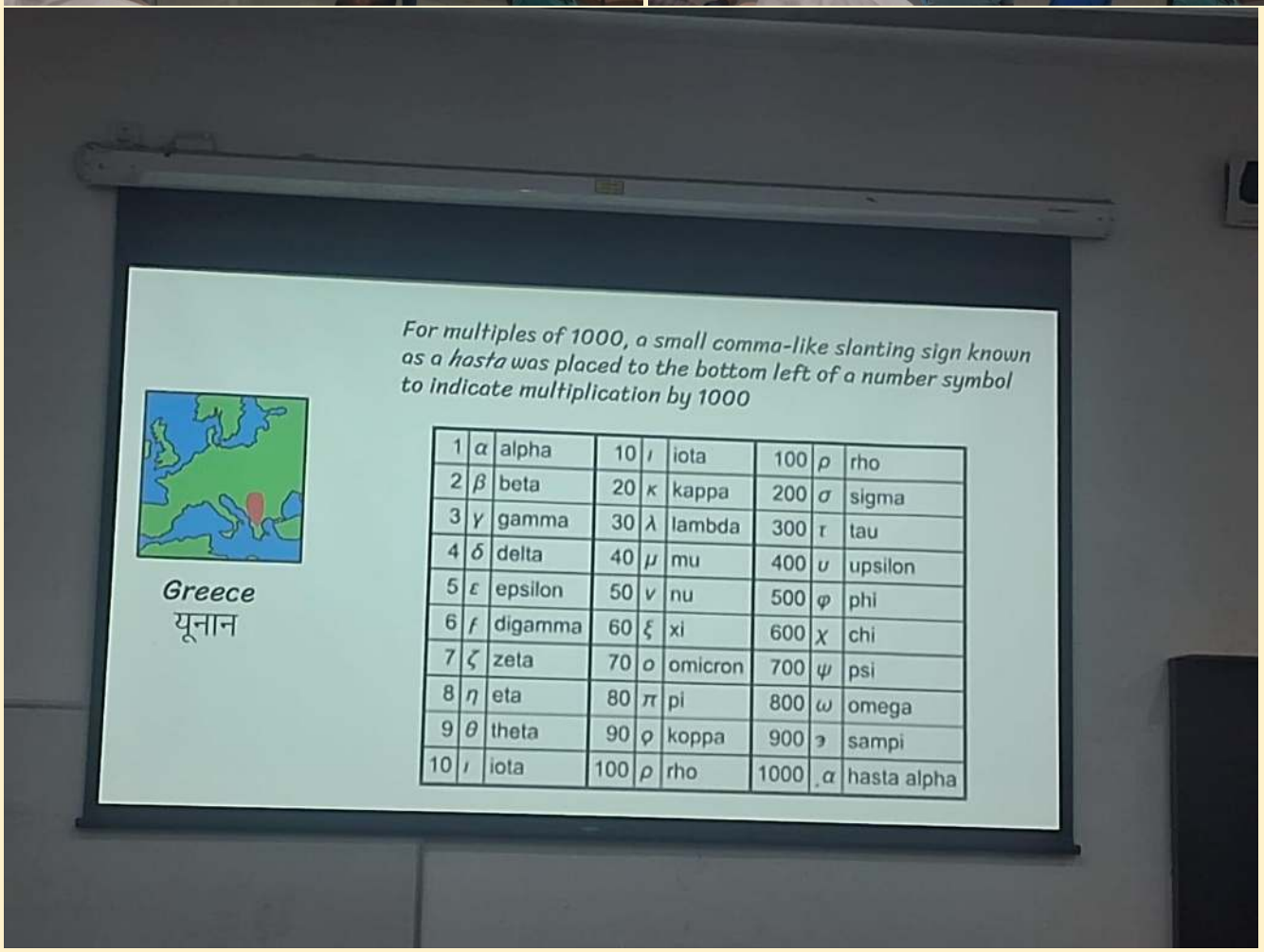

DAY-4 (23/08/24)

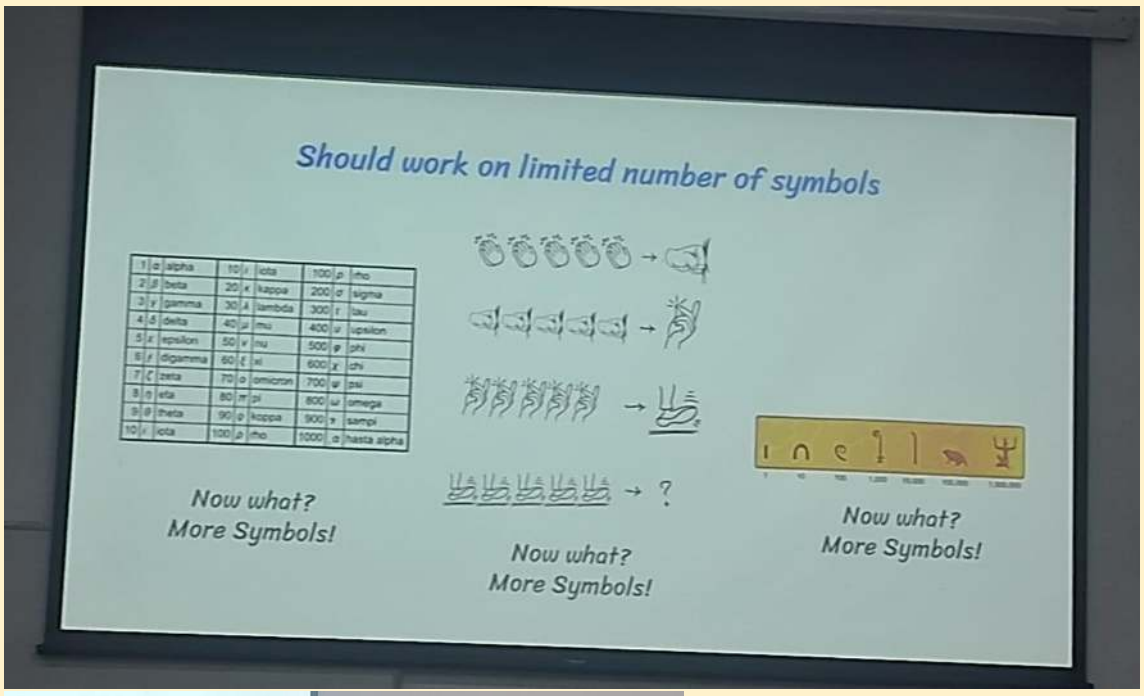
Session 1: Conducted by Ms. Adithi Iyer

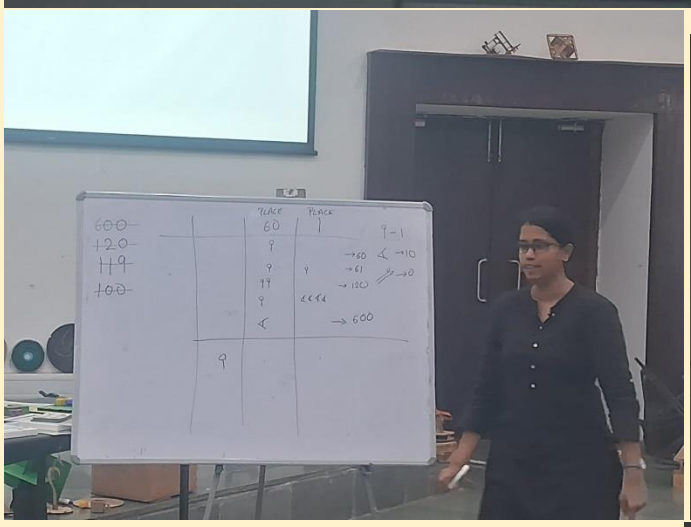
Number Base

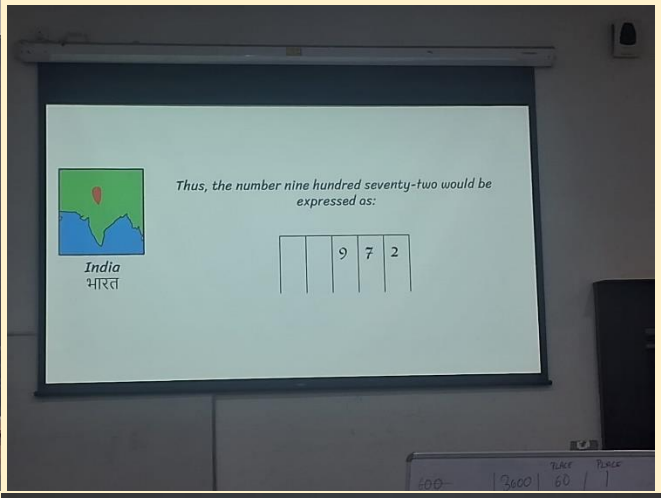
Ms. Adithi in a story telling method explained how the number systems and the representations of numbers evolved in different civilizations. Then all the participants made a their own number system device for any base.

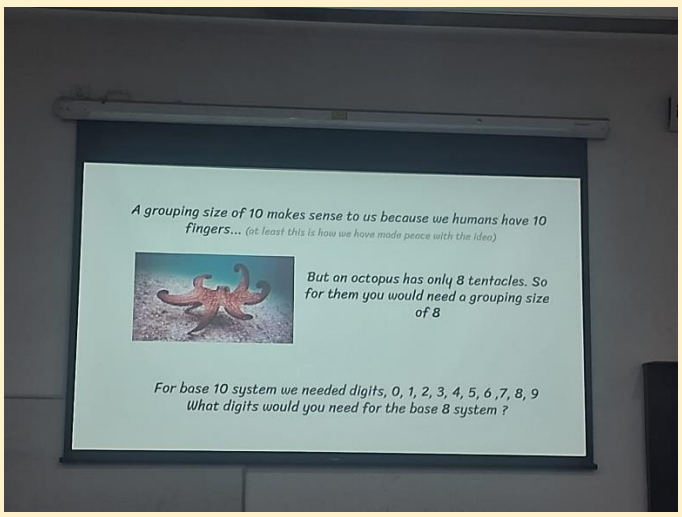


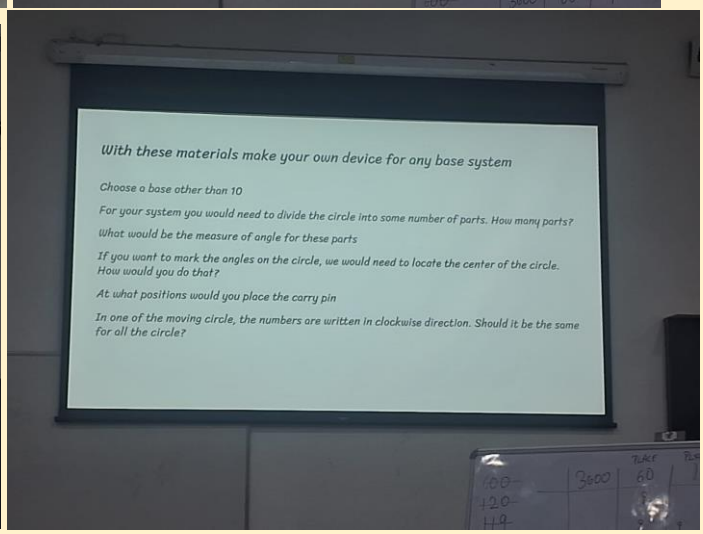


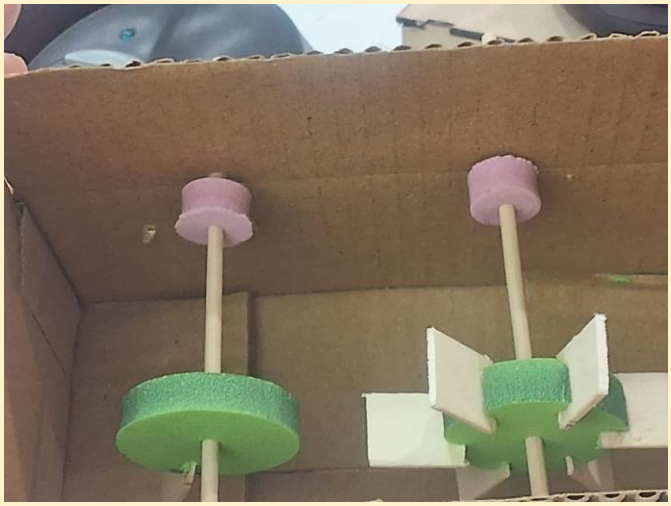

Should work on limited number of symbols
Now what?
More Symbols!
Now what?
More Symbols!
Now what?
More Symbols!

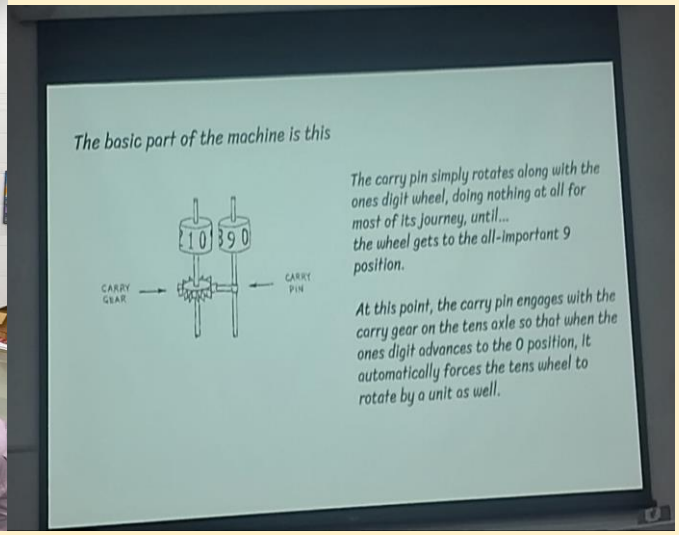



Thus, the number nine hundred seventy-two would be expressed as:
9 7 2
India
भारत


A grouping size of 10 makes sense to us because we humans have 10 fingers... (at least this is how we have made peace with the idea)
But an octopus has only 8 tentacles. So for them you would need a grouping size of 8
For base 10 system we needed digits, 0, 1, 2, 3, 4, 5, 6 ,7, 8, 9
What digits would you need for the base 8 system ?


With these materials make your own device for any base system
Choose a base other than 10
For your system you would need to divide the circle into some number of parts. How many parts?
What would be the measure of angle for these parts
If you want to mark the angles on the circle, we would need to locate the center of the circle. How would you do that?
At what positions would you place the carry pin
In one of the moving circle, the numbers are written in clockwise direction. Should it be the same for all the circle?



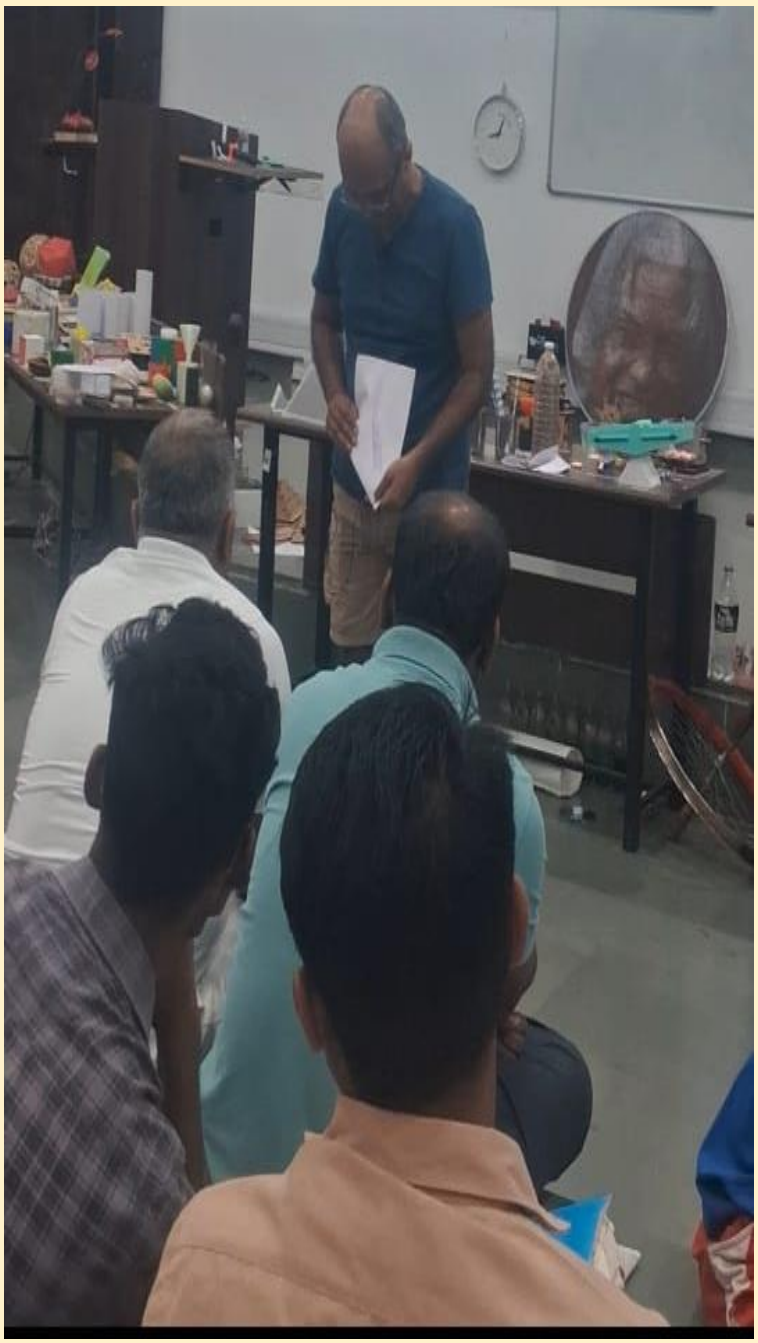


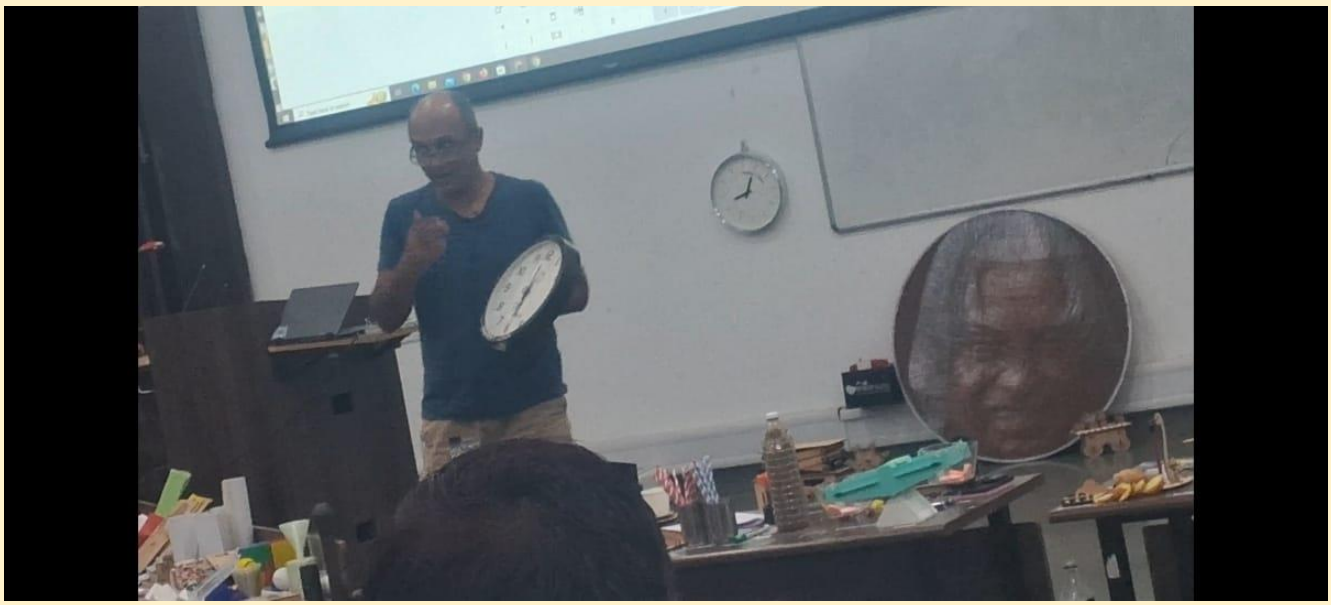
Session 2: Conducted by Mr. Manish Jain

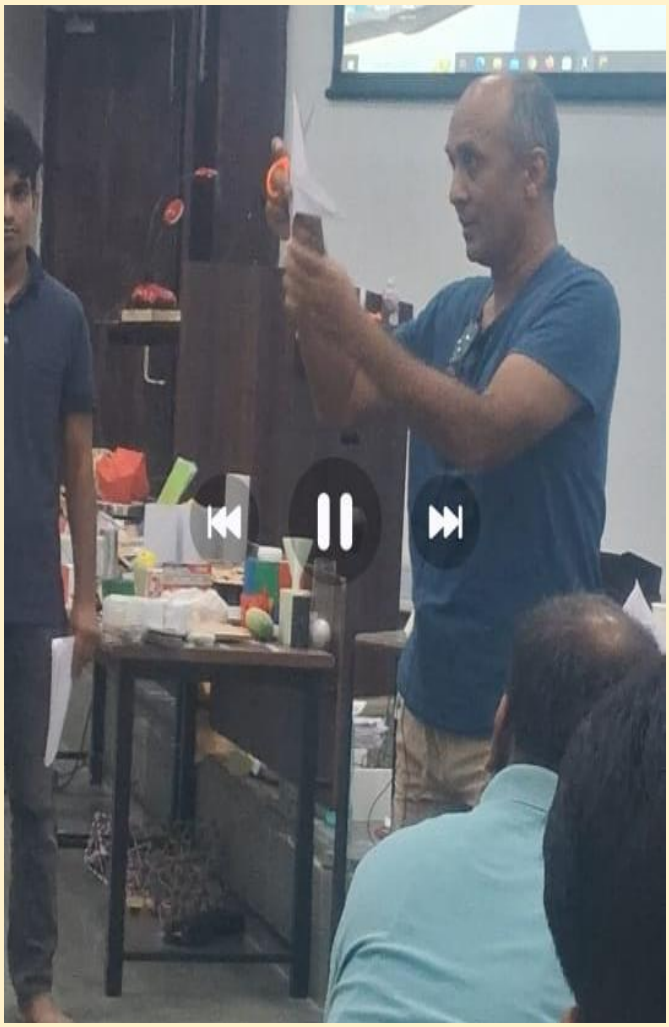
Geogebra & A4 Paper

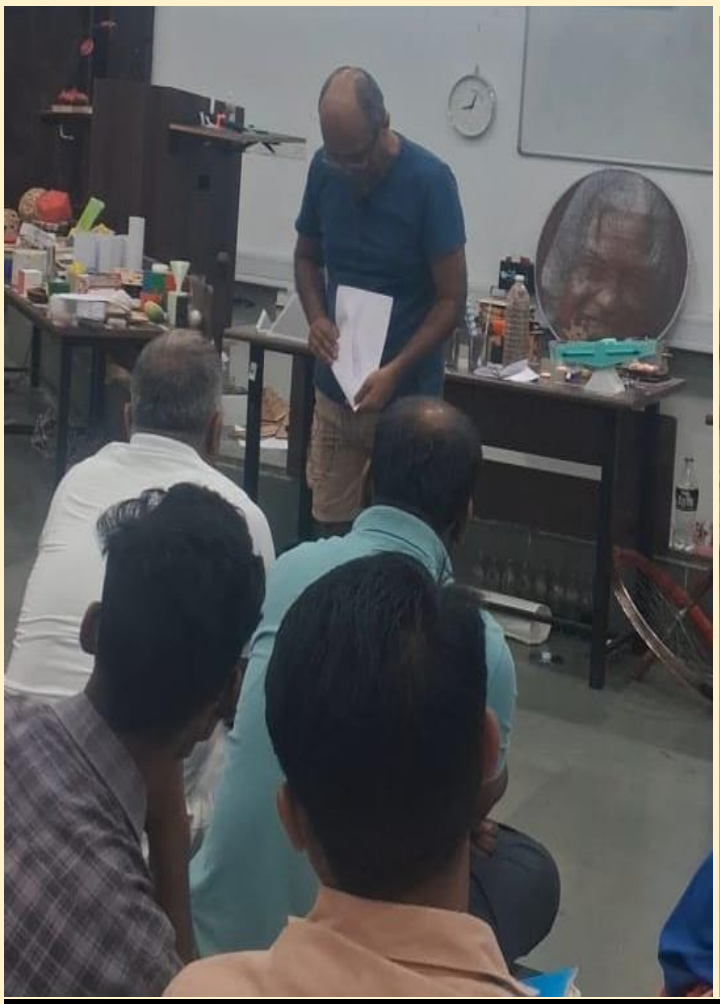
This session was full of energy and demonstration of many concepts, models, games, logics, combinations, ideas of math and science by Manish Sir. He shared ideas behind many of the models in their lab such as-

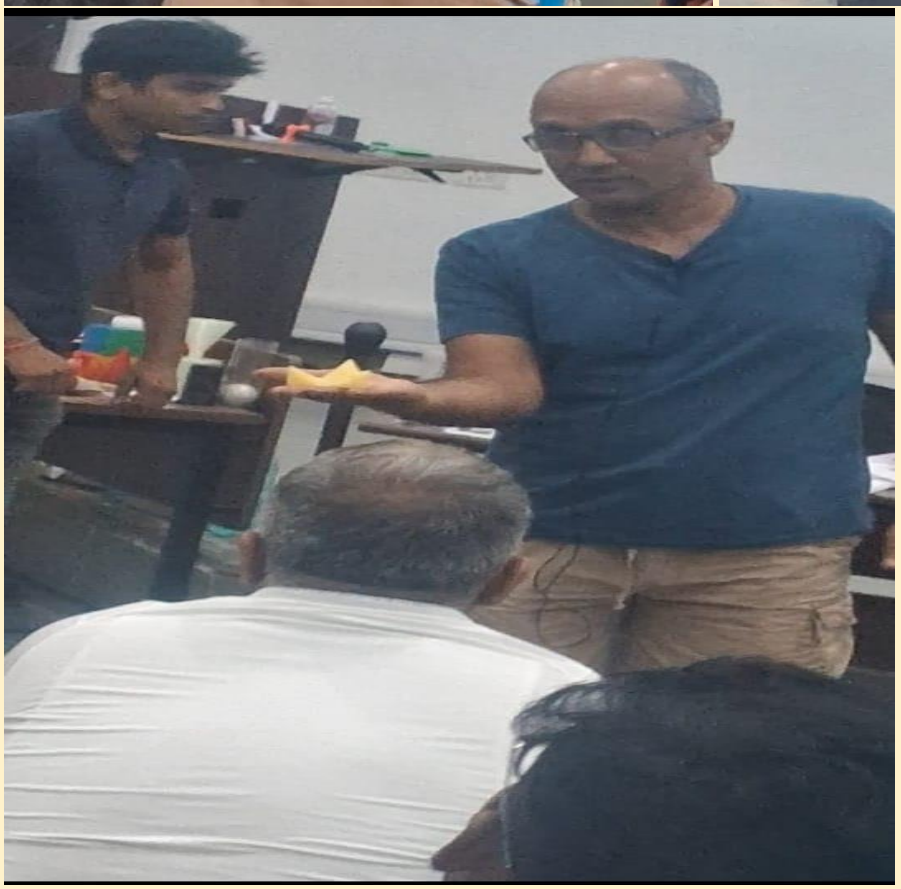
- How different concepts can be experienced through paper- folding such as perpendicular bisector of equilateral triangle and folded circular ring of paper etc.
- Discussion on clock (maximum number of hands required in a clock…) and Calander.
- Cutting hexagon and other shapes from paper
- Cutting pyramids from peace of potato (children enjoy these activities)
- Different waves formed on sand using different shapes such as circle, ellipse (shown in images)
- Sine waves formation using machine.
- Circumference of a circle.

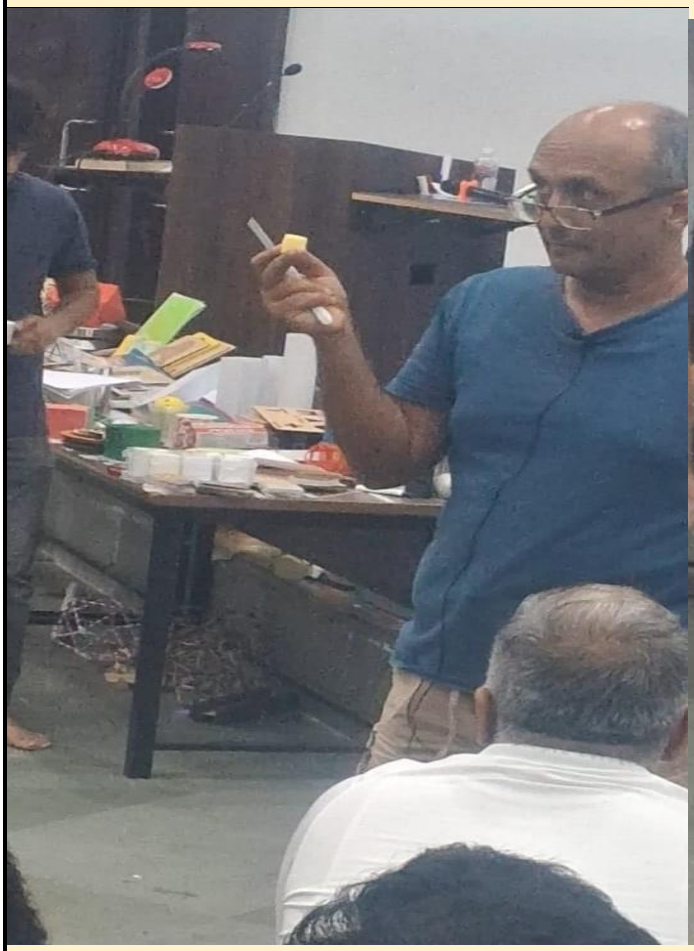


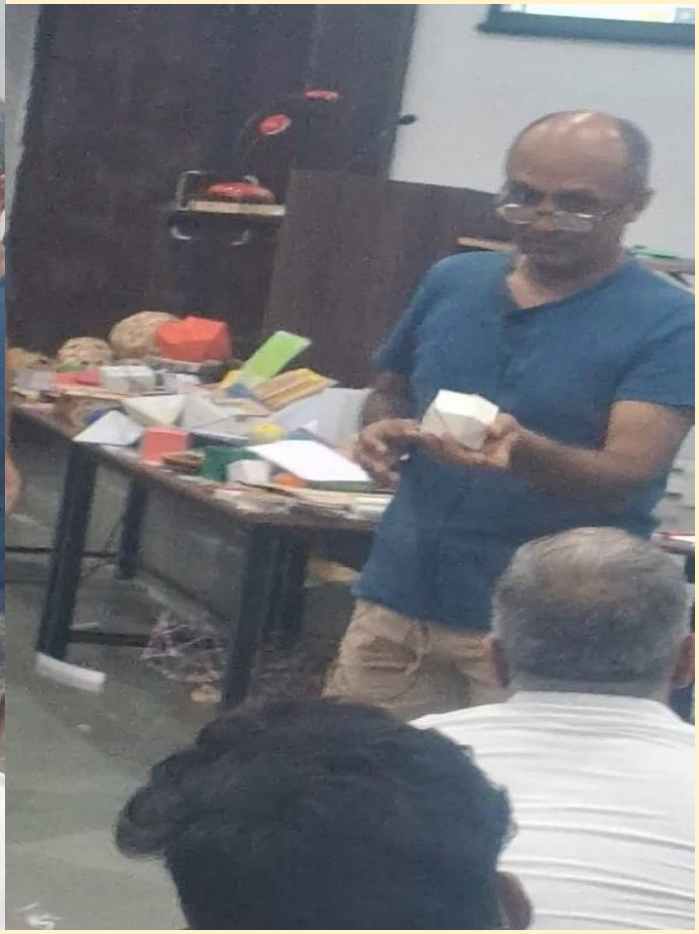










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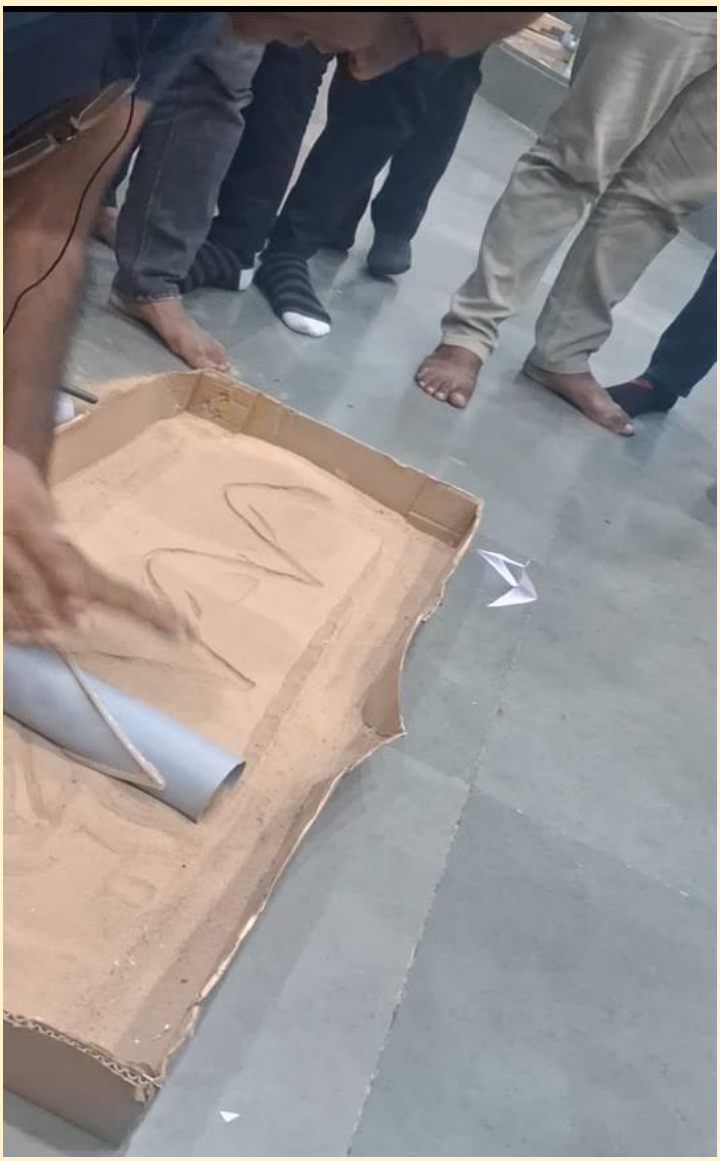
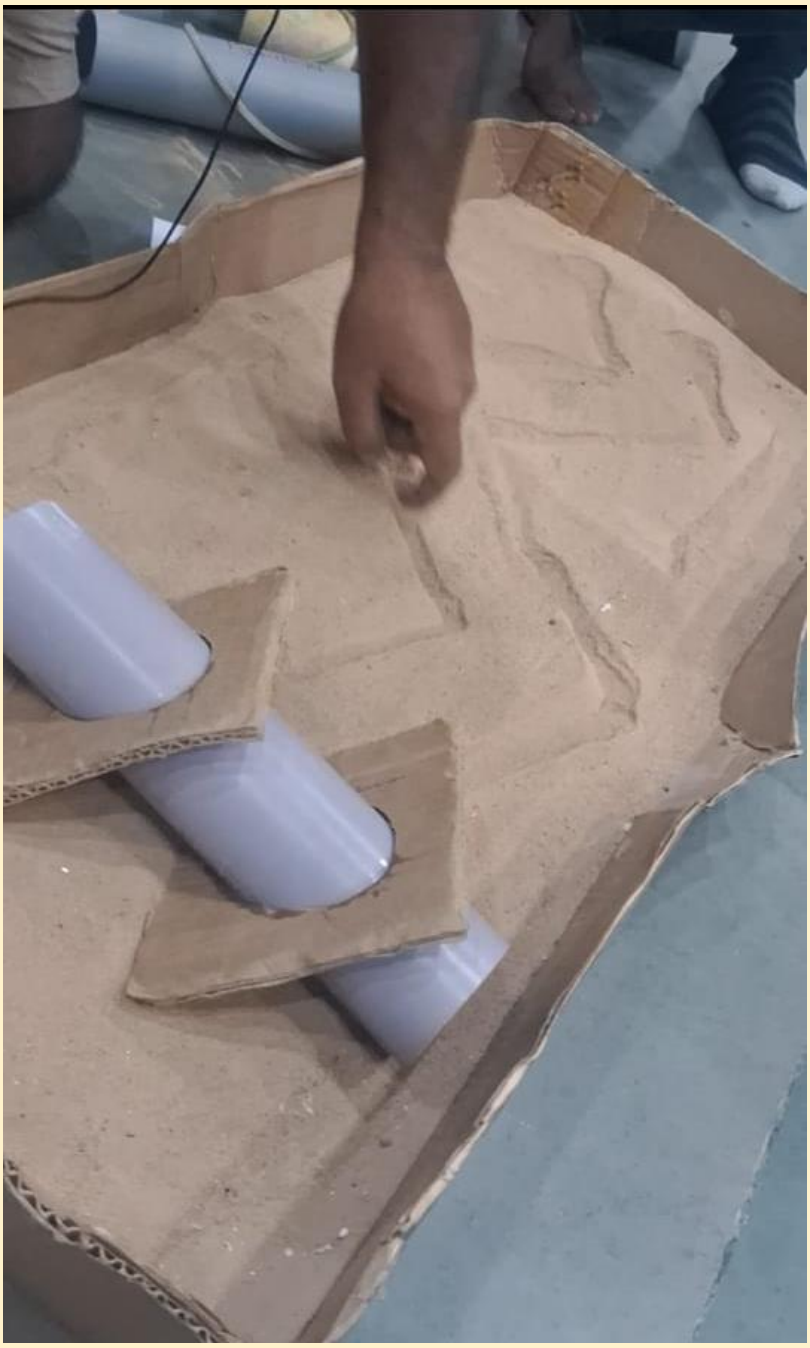
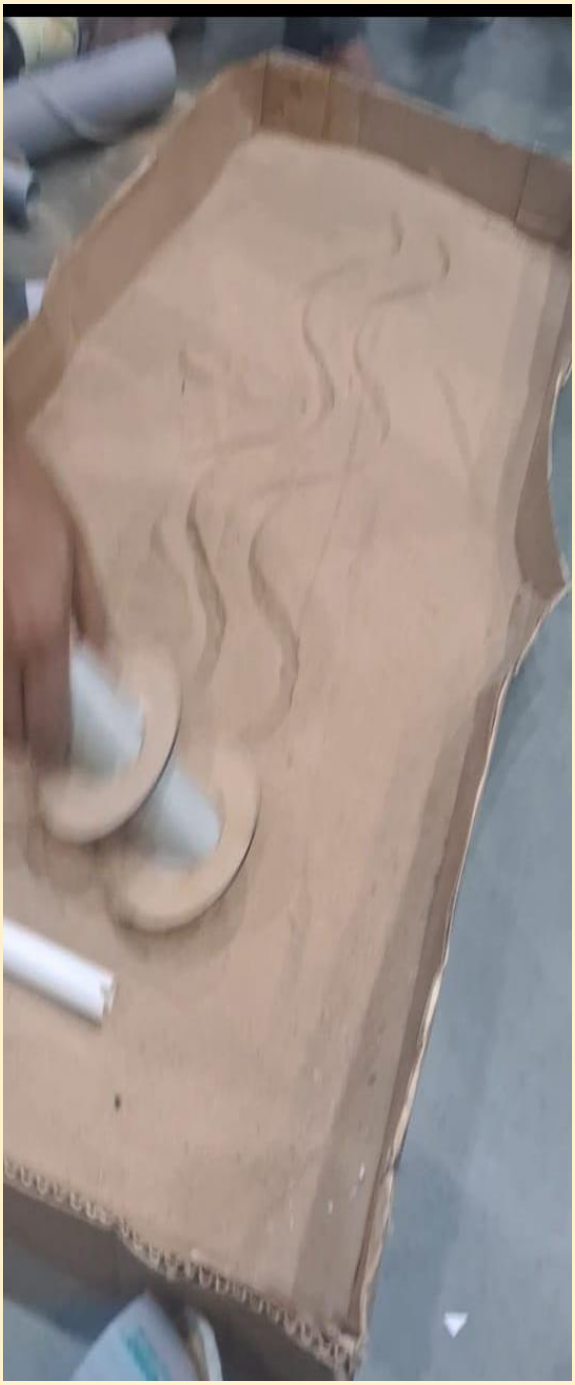


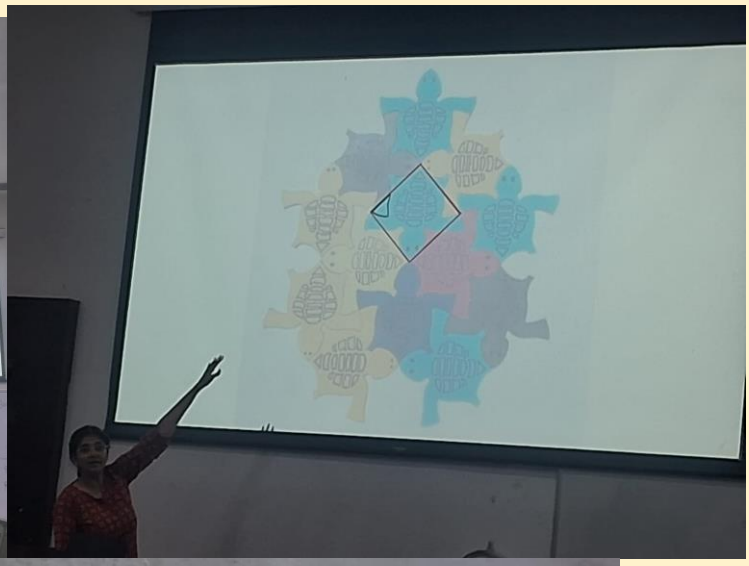


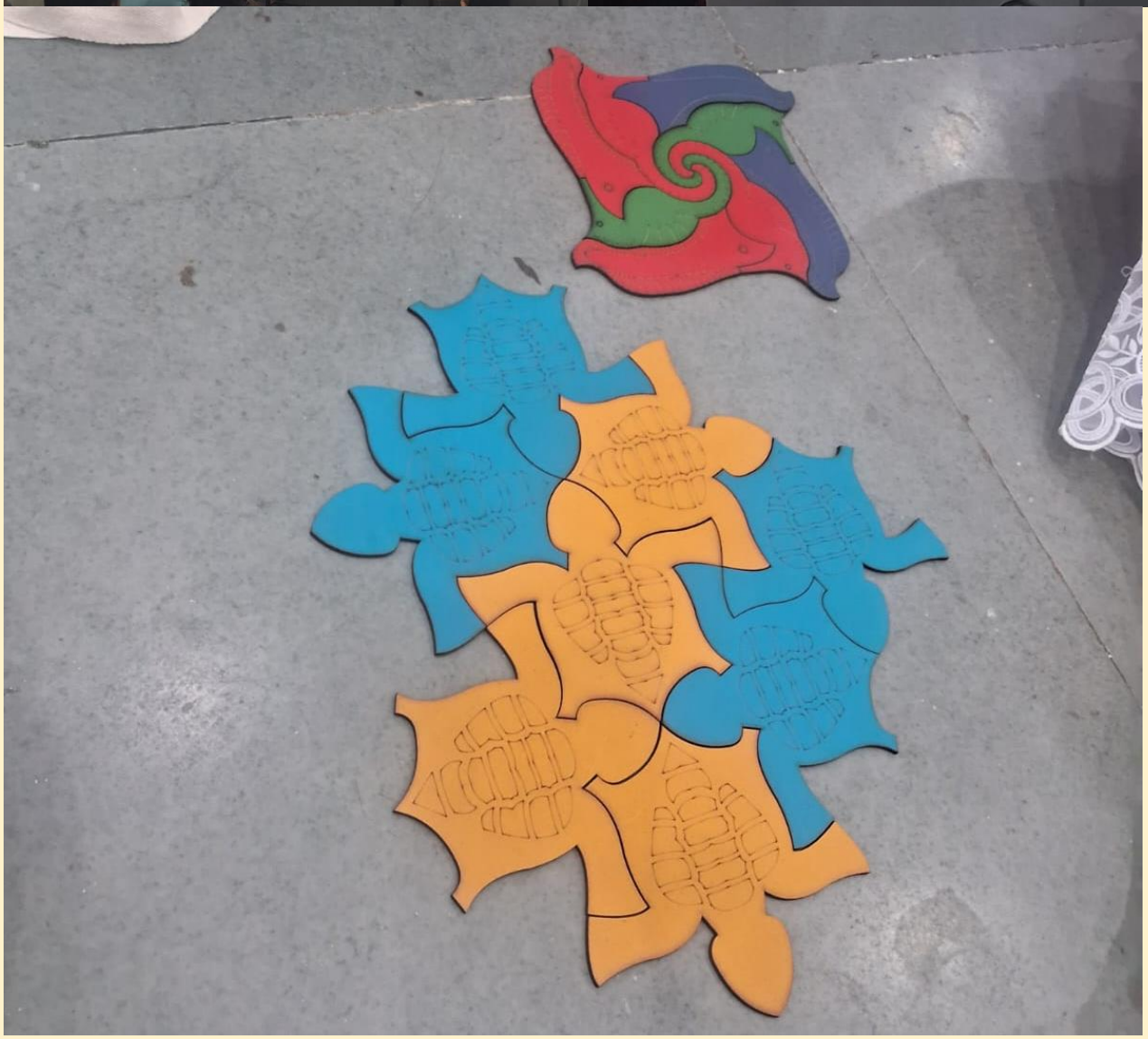


Session 3: Conducted by Ms. Neha Garg

Tessellations

Ms. Neha showed and made participants design their own Tessellations, which is a geometrical pattern made by repetition of a unit pattern.





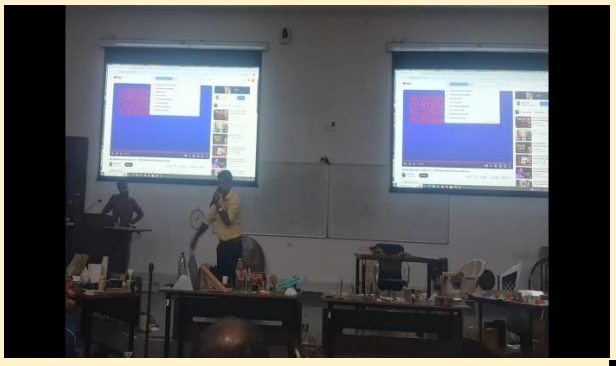
Session 4: Conducted by Ms. Rashmi Ma'am

Child's Education

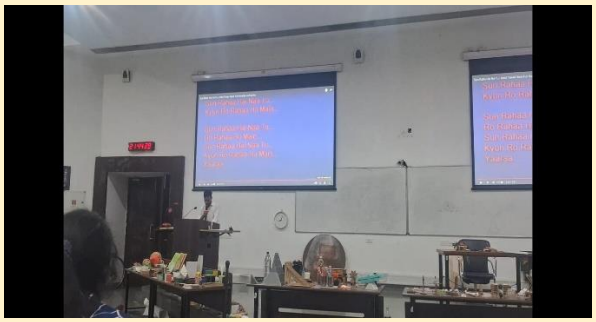
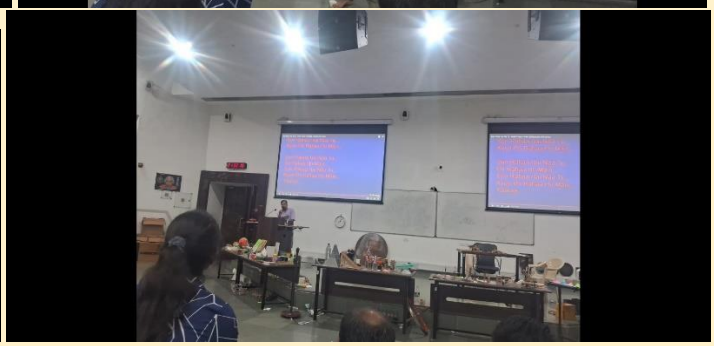
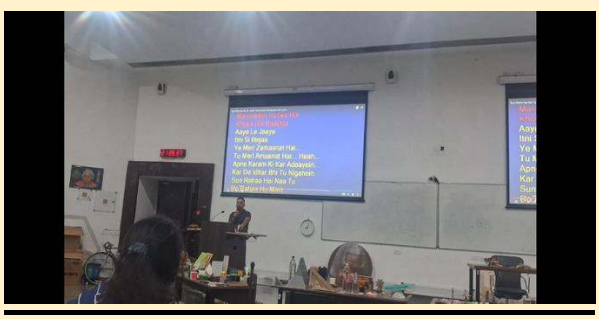
This session was an open discussion with Manish Sir and Rashmi Ma’am. They shared their learnings and experiences for a balanced upbringing of a child. They also shared names of many enriching books and clarified doubts of many of the participants through individual interactions also.

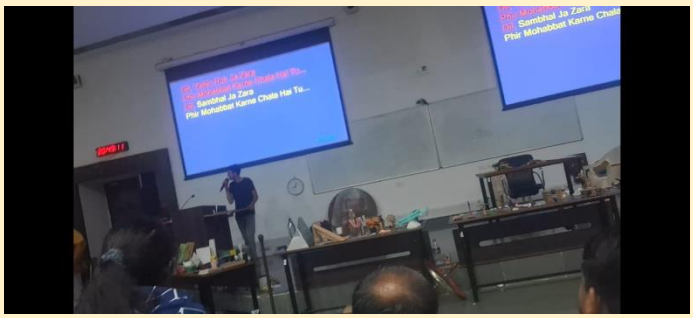
Cultural night

The cultural night was arranged by CCL team and many teachers showed their talent, danced and had a lot of fun together.





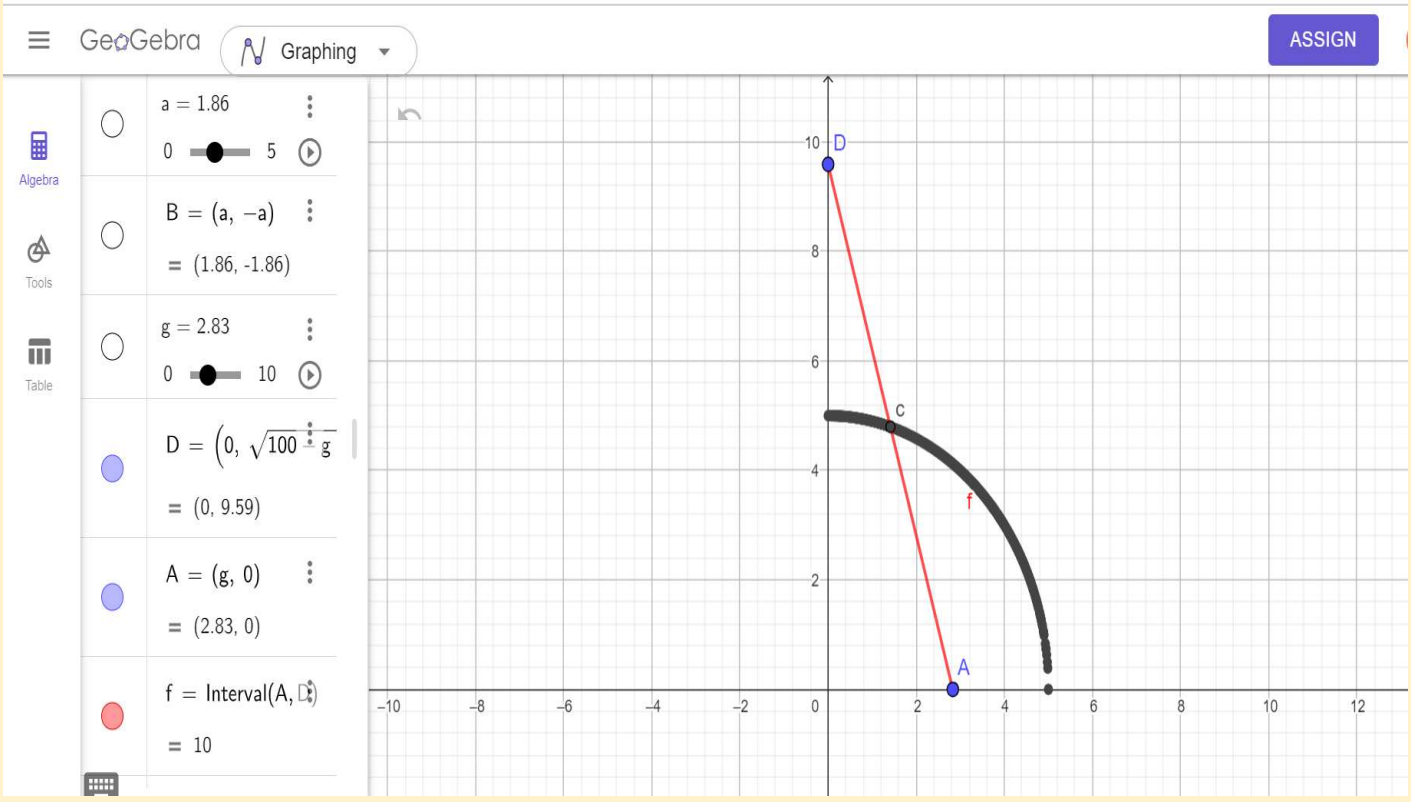

Sambhal Ja Zara
Phir Mohabbat Karne Chala Hai Tu...

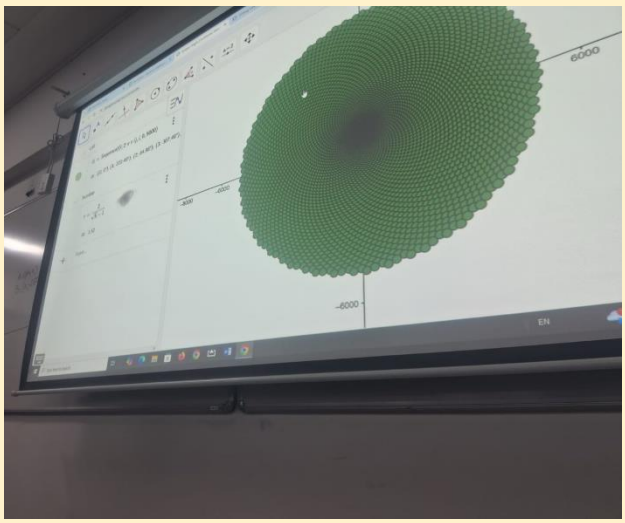
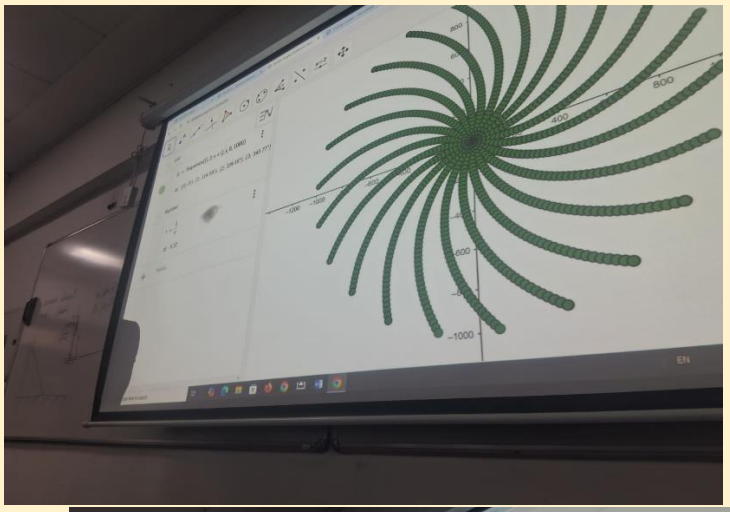
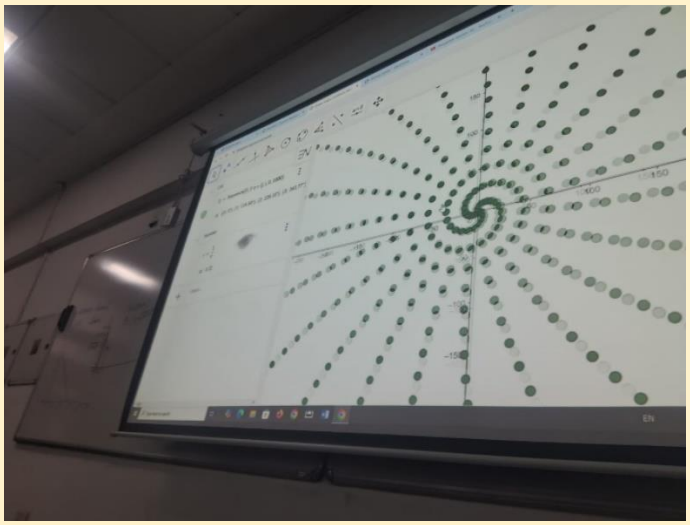
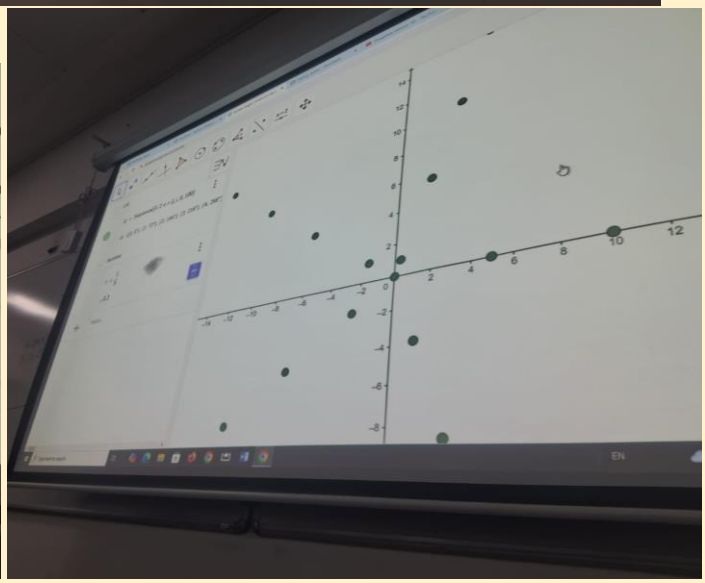
DAY-5 (24/08/24)

Session 1: Conducted by Jay Thakkar, Jyothi Krishnan, Neha Garg & Bijendra

Geogebra HandsOn

The participants were taken to computer lab having around 80 computers and the whole team helped them in learning how to make a moving ladder template using Geogebra software. They showed many other possible uses of this software. Each participant made his/her own template.



Session 2: Conducted by Mr. Abhijit Das

Khoji Box Demo

Many other ideas and scientific models of the lab were shared by Abhijit Sir. All designed different types of hats/caps taught by Abhijit Sir by paperfolding and graduated from IIT, Gandhinagar.


I I T G N


I I T G N

Session 3: Interaction with Manish Jain

Feedback, Resource Sharing & Graduation Ceremony

There were many other toys, Math Models, TLMs which are still to be explored. It would be much more productive if CCL can provide detailed and systematic writeups of their TLMs etc. and the logics behind them also, so that those which could not be discussed can still be explored. their content needed more days for proper exploration. The CCL team also expressed the same need.

Many of the participants expressed their gratitude towards the whole team and Manish Sir. They shared how they felt, what they liked and learned, and how they are going to apply their learnings in future. It was a very enriching experience for all and the environment was full of optimism, gratitude and enthusiasm. The certificates were distributed and pictures were clicked with big smiles.

THE SILENT CONTRIBUTERS:

PEOPLE BEHIND THE SCENE- Gratitude to make our learning comfortable

THANK YOU