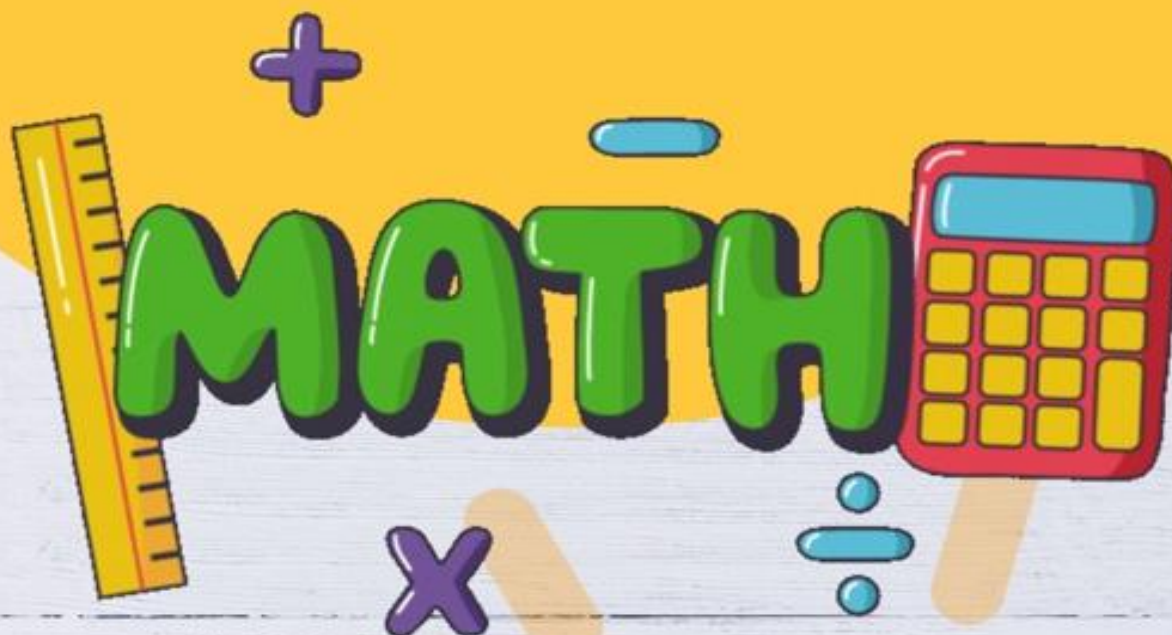


# WORKSHOP MATHAMAGIC



Age-appropriate Innovative workshops to  
bridge the learning gaps in children using  
Maths and Computational thinking .

## INNOVATION

MATHS | COMPUTATIONAL THINKING



[iwanttolearnbetter@gmail.com](mailto:iwanttolearnbetter@gmail.com)

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# Workshop Report

## MATHAMAGIC

*Discover the Power of Numbers through FUN!*

FACILITATOR

Yuvraj Sharma

NGOs

IWANTTOLEARNBETTER

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SARTHAK PRAYAS

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S.N	School	Date	Partners	Volunteers
1	Remal Public School, Sector III, Rohini, Delhi	19 <sup>th</sup> June, 2023	IWANTOLEARNBETTER, Sarthak Prayas	Avantika, Jyoti, Raghav, Ruchira
2	Defense Public School, Chharba, Uttarakhand 248197	26/03/2024	IWANTOLEARNBETTER	Vivan, Gauri, Raghav, Ruchira, Roopsi
3	Rajkeeya Madhyamik Vidhyalaya, Paschimiwala, Vikasnagar, Dehradun, UK	28/03/2024	IWANTOLEARNBETTER	Vivan, Gauri, Raghav, Ruchira, Roopsi
4	Primary School, Paschimiwala, Vikasnagar, Dehradun, UK	28/03/2024	IWANTOLEARNBETTER	Vivan, Gauri, Raghav, Ruchira, Roopsi

## Acknowledgement

I would like to express my deepest appreciation and gratitude to all those who were instrumental in organizing the workshops on "Mathamagic" successfully.

- Special thanks to Mrs. Jyoti Pande, Founder of IWANTTOLEARNBETTER Foundation, for giving me this opportunity to conduct the workshop for school children. Her vision and passion for education are truly inspiring, and I am grateful for her support and guidance throughout the project.
- Mrs. Vandana of Sarthak Prayas Foundation was also instrumental in the smooth conduct of the workshop. Her facilitation skills were invaluable, and she helped to create a positive and engaging learning environment for the children.
- I would also like to thank the volunteers who were so supportive in making the workshop a success. Ms. Avantika, Mr. Raghav, and Mrs. Ruchira were all amazing, and their help made a real difference.
- Finally, I would like to thank Mr. Sumit Sharma for his valuable guidance and support right from the conception of the project until the end. His expertise and insights were invaluable, and I am grateful for his willingness to share his knowledge with me.

I am truly grateful for the support of all of these individuals and organizations. Without their help, the workshops would not have been possible. I am confident that the children who attended the workshops will benefit greatly from the knowledge and skills they learned.

Thank you again for your hard work, dedication, and unwavering support.

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## Objective

The objective of the Mathamagic workshop is to introduce underprivileged children to the exciting world of mathematics in a fun and engaging way. We aim to dispel any fears or negative perceptions they may have towards the subject and replace them with a sense of curiosity, enthusiasm, and confidence. Through interactive activities, games, and puzzles, we will demonstrate that math is not only useful but also enjoyable.

Our goal is to foster a positive mindset towards mathematics, encouraging the participants to explore its various concepts and applications. By presenting math as a magical tool that can help solve real-world problems and unlock doors of opportunity, we hope to inspire these young minds to embrace the subject and pursue further studies. Ultimately, we want to empower these underprivileged children with the knowledge and skills needed to succeed in academics and beyond, instilling in them a lifelong love for math and its limitless possibilities.

## Workshop Methodology

The Mathamagic workshop utilizes a combination of interactive and participatory methodologies to make the learning experience engaging and enjoyable for underprivileged children. The following methodologies are employed:

1. **Hands-on Activities:** Participants engage in hands-on activities such as puzzles, fun games, and real-life problem-solving exercises in groups. These activities are designed to make math concepts tangible and relatable, fostering active learning and critical thinking.
2. **Visual Aids:** Visual aids like charts, diagrams, and colorful illustrations are used to enhance understanding and make abstract concepts more accessible. Visual representations help in grasping mathematical ideas and building mental images.
3. **Group Collaboration:** Collaborative learning is encouraged through group activities and discussions. Participants work together to solve problems, fostering teamwork, communication, and peer support. This approach promotes a sense of community and enhances problem-solving skills.
4. **Storytelling:** Math concepts are presented through storytelling, making the subject more relatable and engaging. Stories and examples are used to illustrate how mathematics is applicable in everyday life, creating a connection between abstract concepts and real-world scenarios.
5. **Gamification:** Games and quizzes are incorporated into the workshop to make learning interactive and enjoyable. By turning learning into a game, participants stay motivated and develop a positive attitude towards math.
6. **Personalized Attention:** Each participant is given individual attention to address their specific needs and challenges. Facilitators provide guidance, support, and encouragement to ensure that every child feels valued and included.

Overall, the workshop methodology aims to create a dynamic and inclusive learning environment that sparks curiosity, builds confidence, and cultivates a love for mathematics among underprivileged children.

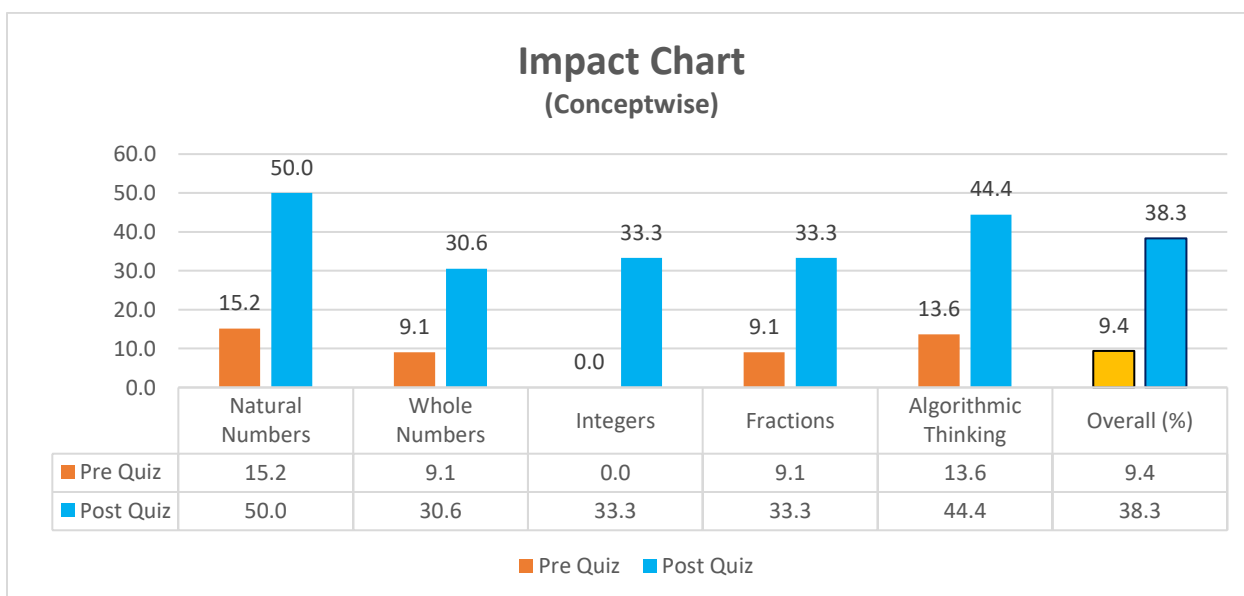
## Workshop#1 : Remal Public School, Rohini, New Delhi

Participant Profile	
Number of Children	40
Age Group	7 – 11 Years
Class Range	2 Grade – 6 Grade
Mode of delivery	Whiteboard and Props

### Impact Analysis

#### Performance Outcome

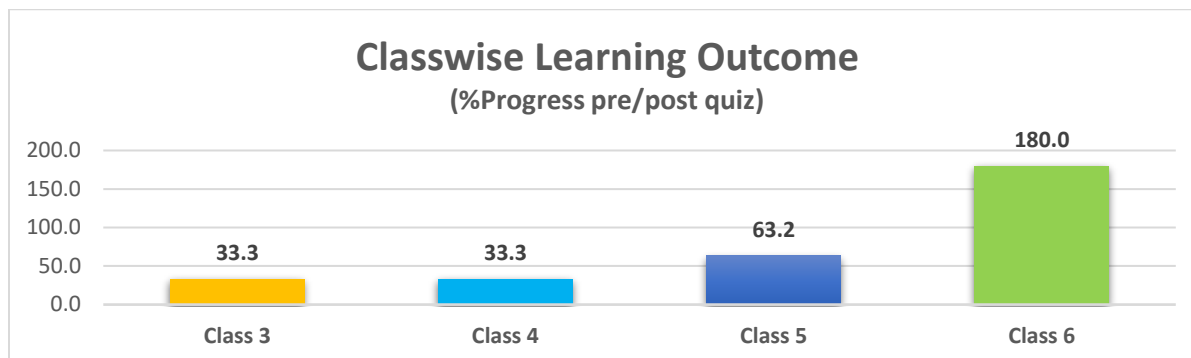
The students exhibited significant improvement in their understanding of the mathematical concepts covered in the workshop with a particular focus on Type of Numbers and Algorithmic Thinking. Notably, the students demonstrated remarkable progress in grasping the concepts of natural numbers, integers, fractions and algorithmic thinking.



The workshop has had a significant and remarkable impact, especially on students from Class 6, who achieved an impressive 180% improvement in their post-assessment scores compared to their pre-



assessment results. Students from Class 3, 4, and 5 also demonstrated improvement, albeit to a lesser extent than Class 6. They exhibited respective scores increases of 33%, 33%, and 63% in their post-assessment evaluations.



## Workshop at a glance



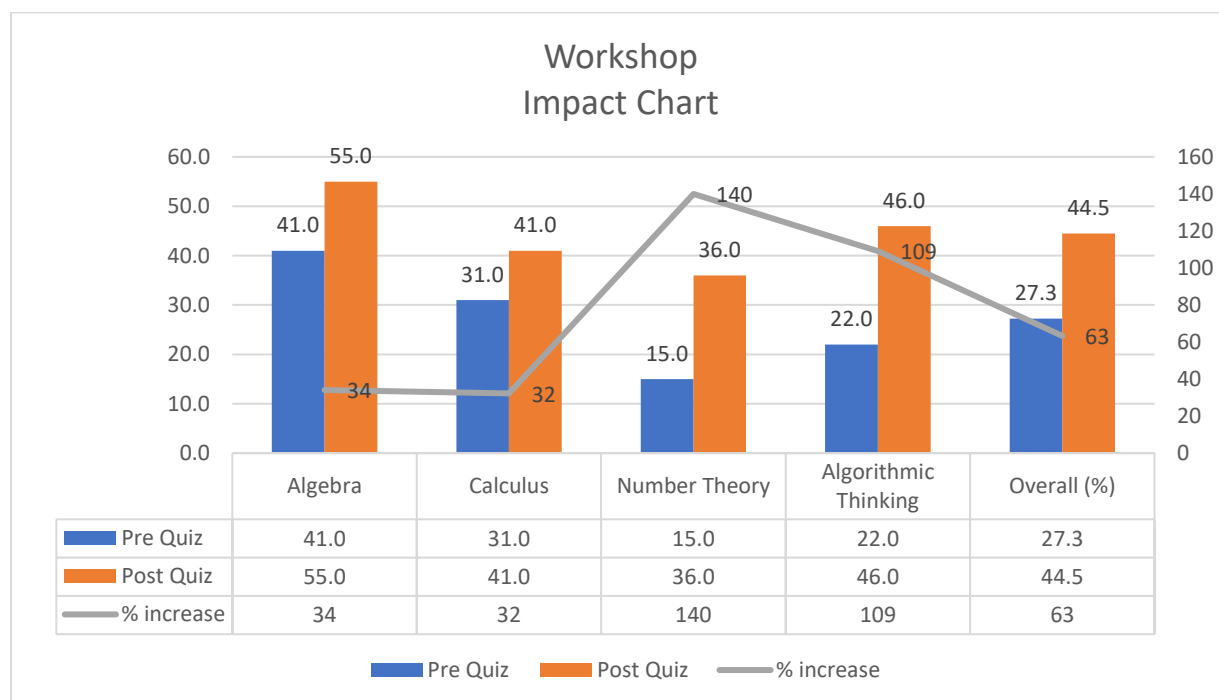


## Workshop #2: Defense Public School, Chharba, Horawala, Dehradun, Uttarakhand, INDIA

Participant Profile	
Number of Children	41
Age Group	16 – 18 Years
Class Range	Grade 11-12
Mode of delivery	Whiteboard and Props

### Impact analysis

#### Performance Outcomes



The data on pre-quiz and post-quiz scores for 56 students at Defense Public School, reveals positive results.

- **Pre-Quiz Scores (Average: 1.9/7):** with class minimum of 1.2 and maximum 6.
- **Post-Quiz Scores (Average: 3.2/7):** with Class minimum 2.8 and maximum 6.4.

### Individual Student Performance

Analyzing changes in individual student performance provides a more comprehensive picture:

- **High Gainers (18 Students):** A significant number of students (18) demonstrated substantial improvement (e.g., score increase of 3 or more points) on the post-quiz. This highlights the effectiveness of the intervention for these individuals.
- **Low Gainers (15 Students):** However, 15 students showed minimal improvement (e.g., score increase of 1 point or less) on the post-quiz. Investigating their pre-quiz scores and learning styles may reveal areas/topics requiring additional support or alternative teaching strategies.

### Workshop at a glance



## Conclusion

The recent workshop targeted at high school students from Indian rural backgrounds aimed to enhance their mathematical skills and critical thinking abilities. Here are the key findings and conclusions based on the analysis of pre- and post-workshop quiz results:

### **Overall Improvement:**

The workshop achieved a commendable overall improvement of 63% across all topics, reflecting its effectiveness in enhancing students' mathematical understanding.

### **Algebra and Calculus:**

Students exhibited strong performance in algebra and calculus even before the workshop, indicating a solid foundation in these subjects.

While the workshop contributed to marginal improvements in algebra and calculus, the gains primarily reinforced existing knowledge rather than introducing new concepts.

### **Number Theory and Algorithmic Thinking:**

The most significant improvements were observed in number theory and algorithmic thinking, with scores surpassing 100% improvement.

This remarkable progress achieved suggests that the workshop effectively addressed gaps in foundational mathematical concepts and introduced students to systematic problem-solving approaches.

### **Background Analysis:**

Students from Indian rural backgrounds, with less educated parents, neighbors, and friends, demonstrated remarkable potential for learning mathematics and algorithmic thinking.

Despite facing educational challenges, they showcased resilience and aptitude, indicating the transformative impact of targeted educational interventions.

### **Recommendations:**

Continued support and resources should be provided to students from disadvantaged backgrounds to further nurture their mathematical abilities.

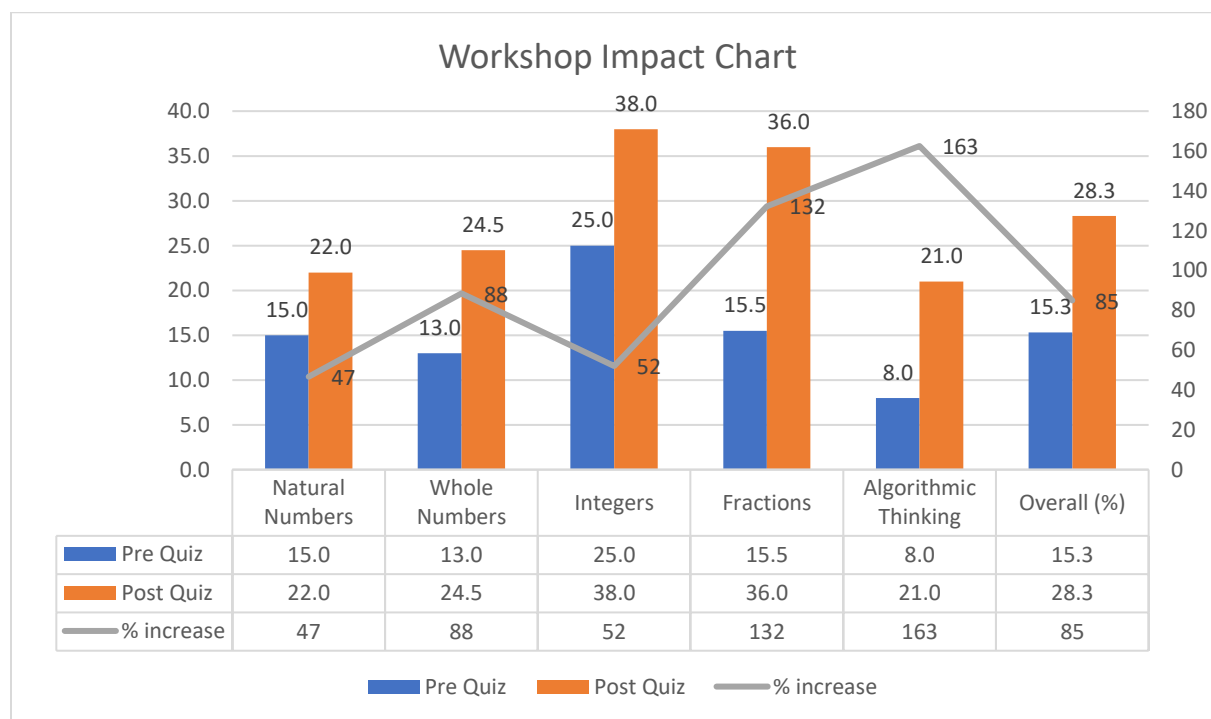
Future workshops could focus on building upon existing knowledge in algebra and calculus while continuing to emphasize abstract mathematical concepts and problem-solving strategies.

**In conclusion**, the workshop succeeded in bolstering students' mathematical skills, particularly in number theory and algorithmic thinking, while also reinforcing their understanding of algebra and calculus. By providing tailored support and resources, such interventions have the potential to empower students from disadvantaged backgrounds and unlock their full academic potential.

## Workshop #3: Rajkeeya Madhyamik Vidhyalaya, Vikasnagar, Uttarakhand

Participant Profile	
Number of Children	50
Age Group	12-15 Years
Class Range	6 Grade – 8 Grade
Mode of delivery	Whiteboard and Props

### Impact Analysis



The data on pre-quiz and post-quiz scores for 50 students, reveals following data points,

- **Pre-Quiz Scores (Average: 1.1/7):** with class minimum of 0 and maximum 3.6.
- **Post-Quiz Scores (Average: 1.9/7):** with Class minimum 0.8 and maximum 5.3.

### Individual Student Performance

Analyzing individual changes provides a more comprehensive picture:

- **High Gainers (7 Students):** 14% of the class demonstrated substantial improvement (e.g., score increase of 3 or more points) on the post-quiz. This highlights the effectiveness of the intervention for these individuals.
- **Low Gainers (21 Students):** However, 42% of the class students showed minimal improvement (e.g., score increase of 1 point or less) on the post-quiz. Investigating their pre-quiz scores and learning styles can reveal areas requiring additional support or alternative teaching strategies.

## Conclusion

Here are the key findings and conclusions based on the analysis of pre- and post-workshop quiz results, from workshop conducted at Rajkeeya Madhyamik Vidhyalaya (a middle school students only) with rural background students.

### Overall Improvement:

The workshop achieved an impressive overall improvement of 85% across all topics, indicating its effectiveness in enhancing students' understanding of mathematical concepts.

### Natural Numbers, Whole Numbers, Integers, and Fractions:

Significant improvements were observed in understanding natural numbers, whole numbers, integers, and fractions.

These foundational concepts saw improvements ranging from 47% to 132%, reflecting the workshop's success in clarifying basic mathematical principles.

### Algorithmic Thinking:

The most notable improvement was observed in algorithmic thinking, with a remarkable 163% increase.

This significant progress suggests that the workshop effectively introduced students to systematic problem-solving approaches and logical reasoning techniques.

### Background Analysis:

Similar to the previous workshop, students from backgrounds with less access to formal education demonstrated remarkable potential for mathematical learning.

Despite facing educational challenges, they showcased resilience and aptitude, highlighting the transformative impact of targeted educational interventions.

### Recommendations:

Continued support and resources should be provided to students from disadvantaged backgrounds to further nurture their mathematical abilities.



Future workshops could focus on building upon existing knowledge in arithmetic while continuing to emphasize abstract mathematical concepts and problem-solving strategies.

In conclusion, the workshop succeeded in bolstering students' mathematical skills, particularly in foundational arithmetic concepts and algorithmic thinking. By providing tailored support and resources, such interventions have the potential to empower students from disadvantaged backgrounds and unlock their full academic potential.

## Workshop at a glance

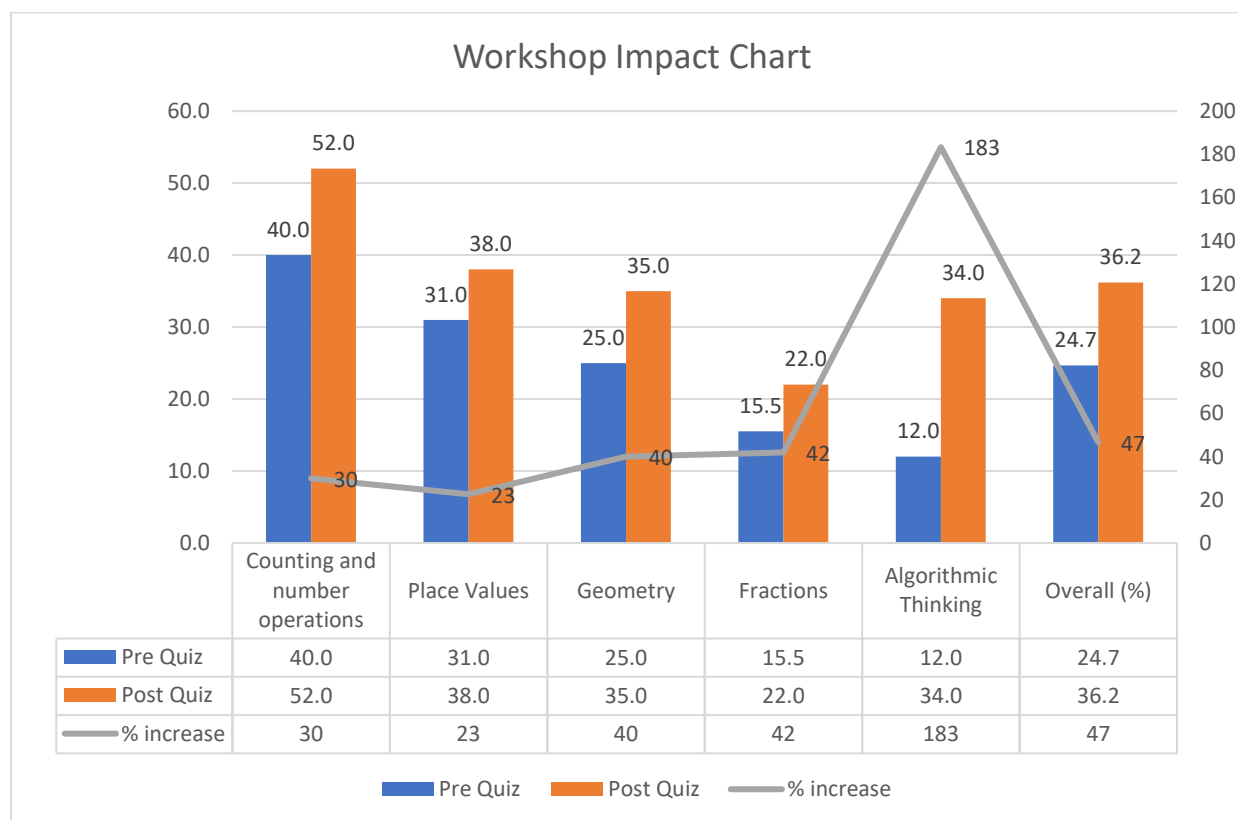




## Workshop #4: Primary School Paschimiwala, Vikasnagar, Uttarakhand

Participant Profile	
Number of Children	41 (24 + 17)
Age Group	6 – 10 Years
Class Range	Prep – 5 Grade
Mode of delivery	Whiteboard and Props

### Impact Analysis



The data on pre-quiz and post-quiz scores for 41 students, reveals following data points,

- **Pre-Quiz Scores (Average: 1.7/7):** with class minimum 0.4 and maximum 4.
- **Post-Quiz Scores (Average: 2.5/7):** with Class minimum 0.8 and maximum 5.5.

## Individual Student Performance

Analyzing individual changes provides a more comprehensive picture:

- **High Gainers (6 Students):** 14.6% of the class demonstrated substantial improvement (e.g., score increase of 3 or more points) on the post-quiz. This highlights the effectiveness of the intervention for these individuals.
- **Low Gainers (10 Students):** However, 24% of the class students showed minimal improvement (e.g., score increase of 1 point or less) on the post-quiz. Investigating their pre-quiz scores and learning styles can reveal areas requiring additional support or alternative teaching strategies.

## Conclusion

The recent workshop encompassed two separate cohorts of students: Cohort #1 comprised students from kindergarten (prep) to grade 1, while Cohort #2 consisted of students from grade 2 to grade 5. Here are the refined findings and conclusions based on the analysis of pre- and post-workshop quiz results:

### Pre-Workshop Assessment:

- Majority of the students demonstrated proficiency in fundamental mathematical topics such as counting, skip counting, number operations, BODMAS, and place values, with pre-quiz scores ranging from 30% to 40%.
- However, students exhibited below-average understanding in slightly more advanced topics such as fractions and geometry, with pre-quiz scores ranging from 15% to 25%.
- Notably, students showed limited awareness in algorithmic thinking (computational thinking), highlighting an area of concern.

### Post-Workshop Improvement:

- The post-quiz results reflected a consistent improvement across all topics, indicating the positive impact of workshop activities.
- Students demonstrated significant growth in their understanding of mathematical concepts, with maximum improvement observed in algorithmic thinking. Many students doubled their pre-quiz scores in this area, reflecting a remarkable 183% increase.
- Encouraging improvements were also noted in topics such as counting and number operations, place values, geometry, and fractions, with percentage increases ranging from 23% to 42%.

### Overall Impact and Recommendations:

- The workshop yielded promising outcomes, particularly in enhancing students' mathematical understanding and proficiency in algorithmic thinking.
- These results underscore the importance of systematic content design in workshops aimed at improving students' performance and interest in mathematics.
- Continued implementation of similar workshops with structured content design can further elevate students' understanding, performance, and interest in mathematics and algorithmic thinking.
- By equipping students with foundational mathematical skills and computational thinking abilities, such workshops prepare them for future technologies and related job opportunities.

**In conclusion,** the workshop successfully addressed gaps in students' mathematical knowledge and significantly improved their performance across various mathematical topics. With a focus on systematic content design and continued implementation, such workshops can play a pivotal role in enhancing students' understanding, performance, and interest in mathematics and algorithmic thinking, thereby preparing them for future academic and professional endeavors. By analyzing the impact of this workshop, we can refine future programs to not only solidify foundational skills but also ignite a passion for exploring the exciting possibilities of mathematics and its applications in various fields.

*Kindergarten Class*



*Class of Kindergarten*



*Class of grade 2 - 5*

