

Report on the Two-Day Workshop for PGT Mathematics Teachers

Theme: Teaching Strategy for Diverse Learners with Special Reference to CBL and CBA and Innovative Intervention in Mathematics Classroom: A Competency-Driven Approach

Venue: Hotel Delta, Bodh Gaya **Dates:** 21–22 August 2026 **Day 1:** 21 August 2026

Participants: PGT Mathematics Teachers

Day 1 – 21 August 2026

The two-day professional development workshop for PGT Mathematics teachers commenced on 21 August 2026 at Hotel Delta, Bodh Gaya. The workshop focused on developing effective teaching strategies for diverse learners, with special emphasis on Competency-Based Learning (CBL), Competency-Based Assessment (CBA), and innovative pedagogical interventions in Mathematics classrooms.

Inaugural Session

The workshop began with a formal inaugural ceremony. The programme was duly inaugurated by **Brigadier Shri Pradeep Kumar, VMC Chairman, Kendriya Vidyalaya No. 2, Gaya**. He formally declared the workshop open and highlighted the importance of continuous professional development and innovative approaches in teaching Mathematics.

Thereafter, **Shri Rajesh Srivastava, Principal, Kendriya Vidyalaya No. 2, Gaya**, along with Shri Pradeep Kumar, addressed the participants. Their deliberations emphasised the need for learner-centric teaching, competency development, classroom innovation, and the effective use of contemporary pedagogical approaches to improve learning outcomes.

Session I – Innovative Approaches to Relations and Functions

The first academic session was conducted by **Dr. Shubh Narayan Singh, Associate Professor, Central University of South Bihar (CUSB), Gaya**.

The session focused on **Relations and Functions** and explored various innovative approaches to teaching these concepts. Dr. Singh demonstrated how abstract mathematical concepts can be connected with real-life situations and everyday experiences to make learning more meaningful and accessible to students.

The session particularly highlighted the importance of moving beyond procedural teaching and encouraging students to understand the underlying mathematical concepts through contextual examples, reasoning and multiple approaches.

Session II – Relations, Functions, Matrices and Determinants

Following the tea break, **Shri Manoj Sharavan, PGT Mathematics, KV NPGCL, Nabinagar**, conducted an engaging and activity-oriented session.

He demonstrated innovative classroom approaches for teaching Relations and Functions, including the use of activities to help students develop conceptual understanding rather than merely memorising definitions and procedures.

The session also covered important aspects of **Inverse Trigonometric Functions**. An interesting technique was discussed for determining angles associated with trigonometric ratios, providing teachers with practical strategies that can help students approach such questions more confidently.

Another significant component of the session was the discussion on **Matrices and Determinants**. A direct and efficient method for finding the inverse of a **3×3 matrix** was demonstrated. Its application in solving systems of linear equations using the concept of **A^{-1}** was also discussed.

Session III – Strategies for Helping Students Achieve Minimum Qualifying Marks

After the lunch break, the next session was conducted by **Shri Vineet, PGT Mathematics, Kendriya Vidyalaya Kankarbagh**.

The session addressed one of the important practical challenges faced by Mathematics teachers—supporting students who struggle to attain the minimum qualifying marks. The discussion focused on identifying important and relatively accessible topics from which questions are frequently asked and developing targeted teaching strategies to help students secure the minimum required marks.

The session emphasised prioritisation of essential concepts, focused practice, question selection, remedial intervention and examination-oriented preparation. This approach was particularly relevant for diverse classrooms, where students have different levels of conceptual understanding and learning needs.

Session IV – Activity-Based Learning and Three-Dimensional Geometry

The final academic session of the day was conducted by **Shri Manoj Sharavan, PGT Mathematics, KV NPGCL, Nabinagar**, after the snacks break.

The session was highly interactive and activity-oriented. Various classroom activities and mathematical problems were discussed to demonstrate how students can be actively involved in the learning process.

Special emphasis was also given to **Three-Dimensional Geometry**. Selected problems were discussed from different perspectives, with focus on conceptual clarity, interpretation of mathematical situations and effective problem-solving approaches.

Key Learning Outcomes of Day 1

- Connecting mathematical concepts with real-life situations can improve conceptual understanding.
- Activity-based learning can make abstract mathematical concepts more engaging.
- Multiple approaches and shortcuts, when used appropriately, can improve students' problem-solving efficiency.
- Competency-oriented teaching should focus on understanding, application, reasoning and problem solving, rather than rote learning.
- Differentiated strategies are essential for addressing the needs of diverse learners.
- Targeted remedial interventions can help academically weaker students achieve minimum qualifying standards.
- Effective prioritisation of topics and systematic practice can improve students' examination performance.
- Innovative approaches can make challenging topics such as Inverse Trigonometric Functions, Matrices, Determinants and Three-Dimensional Geometry more accessible to learners.

Conclusion

The first day of the workshop was highly enriching, interactive and professionally relevant. The sessions successfully combined conceptual understanding, activity-based pedagogy, innovative teaching techniques and examination-oriented interventions.

The workshop provided Mathematics teachers with practical strategies that can be adapted to diverse classroom situations and different learning levels. The emphasis on competency development, learner engagement, real-life connections, differentiated instruction and innovative intervention made the first day particularly useful for strengthening classroom practices and improving learning outcomes in Mathematics.

The first day concluded on a positive and reflective note, with participants gaining several new ideas and strategies that could be implemented in their respective Mathematics classrooms.

DAY 2 REPORT – MATHEMATICS WORKSHOP

Teaching Strategy for Diverse Learners with Special Reference to CBL and CBA and Innovative Intervention in Mathematics Classroom: A Competency-Driven Approach

The second day of the two-day Mathematics Workshop commenced at 9:00 AM with a series of highly engaging and academically enriching sessions focusing on competency-based learning, innovative teaching strategies, and effective classroom interventions in Mathematics.

The first session was conducted by Shri Ramakant Mahto, Resource Person, who led an insightful discussion on important concepts from Class XII Mathematics, particularly Maximum and Minimum, Increasing and Decreasing Functions, and Rate of Change of Quantities. Special emphasis was placed on the development and solution of Competency-Based Questions (CBQs) related to these concepts. The session helped participants understand the finer aspects of identifying critical points, analysing increasing and decreasing intervals, and interpreting mathematical situations involving the rate of change of one quantity with respect to another. The discussion was particularly useful from the perspective of designing and solving real-life and competency-oriented problems in accordance with the NCERT curriculum.

The second session was conducted by Shri Vinod Kumar, PGT Mathematics, PM SHRI Kendriya Vidyalaya No. 1, Gaya, focusing on Integration and Applications of Integrals. The session highlighted the significant role of integration in Class XII Mathematics and explored effective ways of helping students identify the appropriate method of integration. Particular attention was given to recognising whether a problem requires integration by substitution, integration by parts, partial fractions, or the application of standard integral formulae. The discussion also focused on developing students' mathematical intuition so that they can quickly identify the appropriate strategy while solving an integration problem. Participants actively contributed their views and classroom experiences. A detailed discussion was also held on the interpretation of wavy curves/sign charts for determining the nature of a function after critical points while analysing increasing and decreasing behaviour.

The third session was conducted by Shri Amit Kumar Srivastava, PGT Mathematics, KV Muzaffarpur, and focused on Permutation and Combination through Competency-Based Questions. The session explored the conceptual distinction between permutations and combinations and, more importantly, discussed effective pedagogical approaches for communicating these concepts to students. A key takeaway was the fundamental distinction that order is important in permutation, whereas order does not matter in combination. The session provided participants with practical insights into presenting these concepts through contextual and competency-based questions.

After the morning sessions, the participants proceeded for a lunch break.

The post-lunch session was conducted by Shri Naveen Kumar, PGT Mathematics, Kendriya Vidyalaya Jamalpur, with a focus on Trigonometric Functions and Inverse Trigonometric Functions. The session covered higher-order and application-oriented questions based on the Class XI and Class XII curriculum. Participants worked on several challenging problems, including selected questions relevant to the JEE Main level, along with competency-based and higher-order thinking questions. The session enhanced participants' understanding of how advanced problems can be integrated into classroom teaching to develop students' analytical and problem-solving abilities.

After a short snacks break, the final academic session was conducted by Shri Jitendra Kumar Verma, PGT Mathematics, Danapur Cantt. (SS), Patna, focusing on Olympiad-oriented Mathematics problems. The session included challenging problems involving Highest Common Factor (HCF), Least Common Multiple (LCM), polynomials, quadratic equations, and relationships between roots. Participants explored problems in

which conditions involving HCF and LCM were used to determine possible pairs of roots and other mathematical relationships. The session provided valuable exposure to Olympiad-style problem solving and demonstrated how such questions can promote logical reasoning, mathematical creativity, and deeper conceptual understanding among students.

Towards the conclusion of the workshop, an interactive feedback and reflection session was organised. Several participants, including Shri Brijesh Kumar, Shri Chaudhary Sir, Shri Amit Kumar Srivastava, Shri Janardan Sir and Shri Chandan Sir, shared their experiences and key learnings from the two-day workshop. They highlighted how the workshop had enriched their understanding of competency-based teaching, innovative pedagogical practices, higher-order questioning, and effective approaches to Mathematics teaching. The participants expressed their commitment to incorporating these learnings into their classroom practices and sharing them with their students to make Mathematics learning more meaningful, engaging, and competency-oriented.

The workshop concluded with the valedictory address by the Course Director, Shri Rajesh Srivastava, Principal, PM SHRI Kendriya Vidyalaya No. 2, Gaya. In his motivating address, he encouraged the participants to translate the knowledge and strategies gained during the workshop into effective classroom practices and to continuously work towards improving the quality of Mathematics education.

The two-day workshop concluded on a positive and inspiring note with a group photograph followed by certificate distribution among the participants.

Overall Reflection

The second day of the workshop was highly interactive, conceptually rich, and practically relevant. The sessions successfully connected content knowledge with competency-based pedagogy, covering important areas such as calculus, integration, trigonometry, permutation and combination, and Olympiad-oriented problem solving. The workshop provided teachers with valuable strategies for helping students move beyond procedural learning towards conceptual understanding, critical thinking, problem solving, mathematical reasoning, and competency development. The overall experience was fruitful and is expected to contribute meaningfully to the improvement of classroom teaching-learning practices in Mathematics.