तत त्वं पूषन अपावृणु

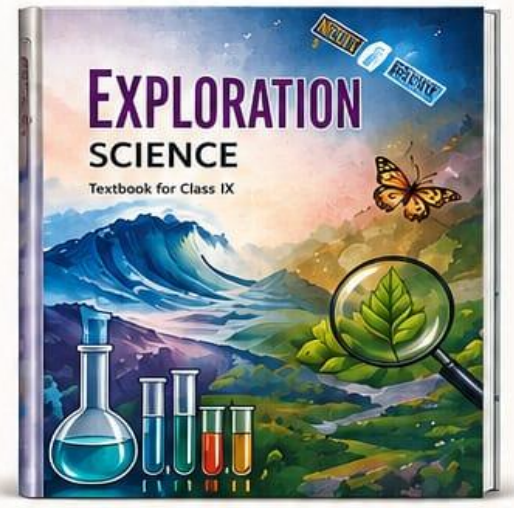
केन्द्रीय विद्यालय संगठन

केन्द्रीय विद्यालय संगठन
KENDRIYA VIDYALAYA SANGATHAN

5 दिवसीय ऑफलाइन कार्यशाला
5 - DAY OFFLINE WORKSHOP

नए पाठ्यपुस्तक में विज्ञान – कक्षा 9 पर मास्टर ट्रेनर्स के लिए ओरिएंटेशन पाठ्यक्रम
ORIENTATION COURSE FOR MASTER TRAINERS ON THE NEW TEXTBOOK IN SCIENCE – CLASS 9

20.07.2026 से 24.07.2026 तक
20.07.2026 to 24.07.2026



ZIET MYSURU
विद्यावेव य वेद मिद्मसर्त्

क्षेत्रीय शिक्षा एवं प्रशिक्षण संस्थान मैसूरू (मैसूरू)
MYSURU
ZONAL INSTITUTE OF EDUCATION AND TRAINING
MYSURU

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Deputy Commissioner, KVS & Director, ZIET Mysuru

ASSOCIATE COURSE DIRECTOR

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COURSE COORDINATOR

Mr. Dinesh Kumar
PGT (Physics)
Training Associate (Science)
ZIET Mysuru

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PM SHRI Kendriya Vidyalaya, Bolarum
Hyderabad Region

2. Mrs. Ushma Teotia

TGT (Science)
PM SHRI Kendriya Vidyalaya No. 2, Jalahalli
Bengaluru Region

DIRECTOR'S MESSAGE

It gives me immense pleasure to reflect upon the successful completion of the **5-Day Offline Orientation Course for Master Trainers on the New Textbook in Science – Class IX**. The enthusiastic participation and wholehearted involvement of the distinguished Master Trainers reaffirmed their commitment to strengthening science education and preparing learners for the challenges and opportunities of the twenty-first century.

The implementation of the National Education Policy (NEP) 2020 and the National Curriculum Framework (NCF) 2023 marks a significant milestone in transforming school education in India. The newly developed Science textbook for Class IX is designed to foster scientific inquiry, critical thinking, problem-solving, creativity, and experiential learning. It encourages learners to explore scientific concepts through observation, experimentation, collaboration, and real-life applications, thereby making science meaningful, engaging, and relevant.

This orientation programme was thoughtfully designed to equip Master Trainers with a comprehensive understanding of the vision, philosophy, and pedagogical approaches embedded in the new textbook. Over the course of five days, participants engaged in interactive discussions, hands-on activities, collaborative learning experiences, and reflective practices that enhanced their preparedness to mentor teachers and facilitate effective classroom implementation.

As Master Trainers, you play a pivotal role in translating the objectives of NEP 2020 and NCF 2023 into meaningful classroom practices. Your leadership, dedication, and professional expertise will continue to inspire teachers to adopt innovative teaching-learning strategies that nurture curiosity, scientific temperament, and competency-based learning among students.

The active participation, rich exchange of ideas, and collaborative spirit displayed throughout the workshop greatly enriched the learning experience. It is hoped that the knowledge and insights gained during this programme will contribute significantly to strengthening classroom practices and promoting joyful, inquiry-based science learning in Kendriya Vidyalayas.

I extend my best wishes to all the participants for continued success in implementing the vision of the new Science textbook and in fostering a lifelong passion for science among their students.

P.I.T RAJA

DIRECTOR

ZIET MYSURU

THE ENCOURAGING NOTE:

The transformation of science education from content-driven instruction to competency-based learning marks a significant step towards preparing students for the challenges of the twenty-first century. A science teacher is no longer expected to be only a transmitter of knowledge but a facilitator who enables learners to observe, investigate, analyses, collaborate, and apply scientific concepts in real-life contexts. Competency-based learning shifts the focus from "what students know" to "what students can do with what they know." This approach nurtures scientific temper, critical thinking, creativity, and responsible decision-making.

The success of competency-based education depends largely on the vision and classroom practices of science teachers. Every lesson should be planned by aligning learning outcomes with competencies, meaningful learning experiences, and appropriate assessment strategies. Activities such as inquiry, experimentation, problem-solving, discussion, and reflection help students construct knowledge actively rather than memorizing facts. Continuous assessment, timely feedback, and opportunities for self-reflection ensure that every learner progresses at their own pace while achieving the desired competencies.

As we move forward with the vision of the National Education Policy 2020 and the National Curriculum Framework, science teachers must become lifelong learners who continuously upgrade their pedagogical skills. Professional collaboration, reflective practice, and the effective integration of technology and local contexts can make science classrooms more engaging and relevant. Competency-based learning is not merely a change in assessment or curriculum; it is a change in mindset Inculcating these qualities in students in the secondary stages can do wonders. Let us, therefore, work together to create classrooms where curiosity is encouraged, inquiry is celebrated, and every learner is equipped with the competencies needed to thrive in an ever-changing world.

—Arti Prasad

Associate Course Director

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KVS ZONAL INSTITUTE OF EDUCATION AND TRAINING MYSURU				
5-day offline workshop on the orientation course for Master Trainers on the new textbook in Science				
Duration: 20.07.2026to 24.07.2026				
LIST OT THE PARTICIPANTS - TGT SCIENCE				
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RP2	USHMA TEOTIA	TGT (SCIENCE)	NO.2 JALAHALLI	BENGALURU
1	M N MADHUMATHI	TGT (SCIENCE)	MG RAILWAY	BENGALURU
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3	SAHANA S U	TGT (SCIENCE)	SHIVAMOGGA	BENGALURU
4	RAMESH KUMAWAT	TGT (SCIENCE)	HUTTI	BENGALURU
5	SHIKHA KUMARI	TGT (SCIENCE)	GANGAVATHI	BENGALURU
6	DR MATHEW CHACKO	TGT (SCIENCE)	BRBNMPL MYSURU	BENGALURU
7	MS. SEEMA SRIVASTAVA	TGT (SCIENCE)	PM SHRI KV NO. 2, MADURAI	CHENNAI
8	MS. V S GAYATHRI	TGT (SCIENCE)	VIJAINARAYANAM SKYLARK (INS)	CHENNAI
9	SMT SWATI SONI	TGT (SCIENCE)	KV NO.1 PONDICHERRY SHIFT I	CHENNAI
10	MR. JAYANTA KUMAR SABAR	TGT (SCIENCE)	PM SHRI KV HVF AVADI	CHENNAI
11	MRS. SHILPI KHANDURI	TGT (SCIENCE)	PM SHRI KV CLRI	CHENNAI
12	MS. PRIYALI PRIYADARSHINI	TGT (SCIENCE)	PM SHRI KV MINAMBAKKAM	CHENNAI
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14	MS. GEETA RANI	TGT (SCIENCE)	KV COIMBATORE	CHENNAI
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17	SUBHADRA SANKAR	TGT (SCIENCE)	PM SHRI KV MALAPPURAM	ERNAKULAM
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20	MRS. SHEENA C GEORGE	TGT (SCIENCE)	PM SHRI KV RB KOTTAYAM	ERNAKULAM
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27	KRISHAN KUMAR YADAV	TGT (SCIENCE)	VENKATAGIRI	HYDERABAD
28	CHITRA LEKHA SHARMA	TGT (SCIENCE)	WARANGAL	HYDERABAD
29	MR PRASHANT	TGT (SCIENCE)	PMSHRI KV KURNOOL	HYDERABAD

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S.No.	NAME OF THE TEACHER	DESIGNATION	NAME OF KV	REGION
1	Dr. Mathew Chacko	TGT (Science)	KV BRBNMPL MYSURU	Bengaluru
2	Mrs. Sheena C George	TGT (Science)	PM SHRI KV RB KOTTAYAM	Ernakulum
3	Mrs. Anjali Yadav	TGT (Science)	KV CHENNAI, IIT	Chennai
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3	Mr. Ramesh kumawat	TGT (Science)	KV HUTTI	Bengaluru
4	Mrs. Shilpi Khanduri	TGT (Science)	PM SHRI KV CHENNAI CLRI	Chennai
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3	Mr. Vaibhav Kumar Kelwa	TGT (Science)	PM SHRI KV No. 2 TIRUPATI	Hyderabad
4	Mrs. C V Prasanna	TGT (Science)	PM SHRI KV KELTRON NAGAR	Ernakulum
5	Mr. Dora Kumar Reddy A	TGT (Science)	PM SHRI KV ONGOLE	Hyderabad

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4	Mr. Yogesh Tomar	TGT (Science)	KV RAJAMPET	Hyderabad

GROUP 5

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3	Mr. Krishan Kumar Yadav	TGT (Science)	PM SHRI KV VENKATAGIRI	Hyderabad
4	Mrs. Athira S Nair	TGT (Science)	PM SHRI KV PATTOM (SHIFT 2)	Ernakulum
5	Mrs. C Resishmi	TGT (Science)	PM SHRI KV THRISSUR	Ernakulum

TIME TABLE NEW TEXT BOOK ORIENTATION IN SCIENCE

DATE	9.00-9.30am	9.30 am- 11.15 am	11.15am - 11.30 am	11.30 am-1.00 pm	1.00pm - 2.00 pm	2.00pm - 3.30 pm	3.30pm-3.45pm	3.45pm - 5.30pm
Why the textbook is designed this way, then how to teach from it, and finally how to assess learning effectively.								
20.07.2026	**INAUGRATION**	Understand the rationale and vision behind the new textbooks: NEP 2020, NCF-SE, Scientific Literacy, Competency-based Education DINESH SIR	TEA BREAK	Appreciate how children learn science: Inquiry, curiosity, critical thinking, experiential learning USHMA MAM	LUNCH BREAK	Analyse chapter design and learning progression: Learning outcomes, activities, projects, QR codes, assessments RENU MAM	TEA BREAK	Micro-teaching Practice teaching 5E model ARTI MAM
21.07.2026	**ASSEMBLY**	Experience inquiry-based science teaching: Constructivism, experiential learning, Questioning, observation RENU MAM		Promote process skills: Observation, investigation, experimentation ARTI MAM		Competency Mapping of the New Science Textbooks: Aligning Chapters with Concepts, Scientific Practices, and Core Values GUEST LECTURE BY GAURI MAM		Connect science with real-life and other disciplines: STEM, sustainability, local context USHMA MAM
22.07.2026	**ASSEMBLY**	Understand assessment for learning: Competencies, learning evidence DEMO TEACHING		Design quality assessment tasks: MCQs, case-based, source-based, HOTS USHMA MAM		Develop competency-based questions: Chapter-wise collaborative work RENU MAM		Improve quality of assessment: Moderation using rubrics ARTI MAM
23.07.2026	**ASSEMBLY**	Design competency-based lessons: Learning outcomes, activities, assessment (Engage-Explore-Explain-Elaborate-Evaluate) GROUP ACTIVITY		Plan for diverse learners: Universal Design for Learning, multilingualism RENU MAM		Use digital resources effectively: QR codes, simulations, virtual labs, AI USHMA MAM		Prepare classroom-ready resources: Lesson planning(Collaborative Lesson Planning Finalize lessons Teaching resources) GROUP ACTIVITY
24.07.2026	**ASSEMBLY**	Create classroom support materials: Worksheets, projects, observation sheets(Teacher Resource Kit) GROUP ACTIVITY		Present developed resources: Group presentations(Share resources Best practices)		Develop school action plans: Academic planning, PLCs, mentoring		Valedictory: Reflection, feedback, way forward

5 -DAY OFFLINE WORKSHOP OF MASTER TRAINERS ON NEW TEXTBOOK OF SCIENCE CLASS –IX

REPORT FOR DAY-1 (20-07-2026)

The day began with a warm welcome by our Course Coordinator, Shri Dinesh Kumar Sir, to all the participants of the Five-Day Master Trainer Workshop on the New Science Textbook *Exploration*. The workshop commenced with the KVS morning prayer, setting a positive and enthusiastic tone for the day. This was followed by a unique self-introduction activity where each participant introduced themselves using one adjective that best described their personality.

SESSION 1: Understanding the Vision Behind the Development of New Textbooks

Taken by: Shri Dinesh Kumar Sir

The session focused on the vision and philosophy behind the development of the new science textbooks. Through thought-provoking questions related to the basic understanding of science, Sir encouraged active participation. He explained the purpose of science education, the importance of 21st-century skills, and the shift from traditional to modern classrooms. The discussion also highlighted the application of science in everyday life, including the kitchen, garden, hospitals, markets, and other sectors.

SESSION 2 : How Children Learn Science?

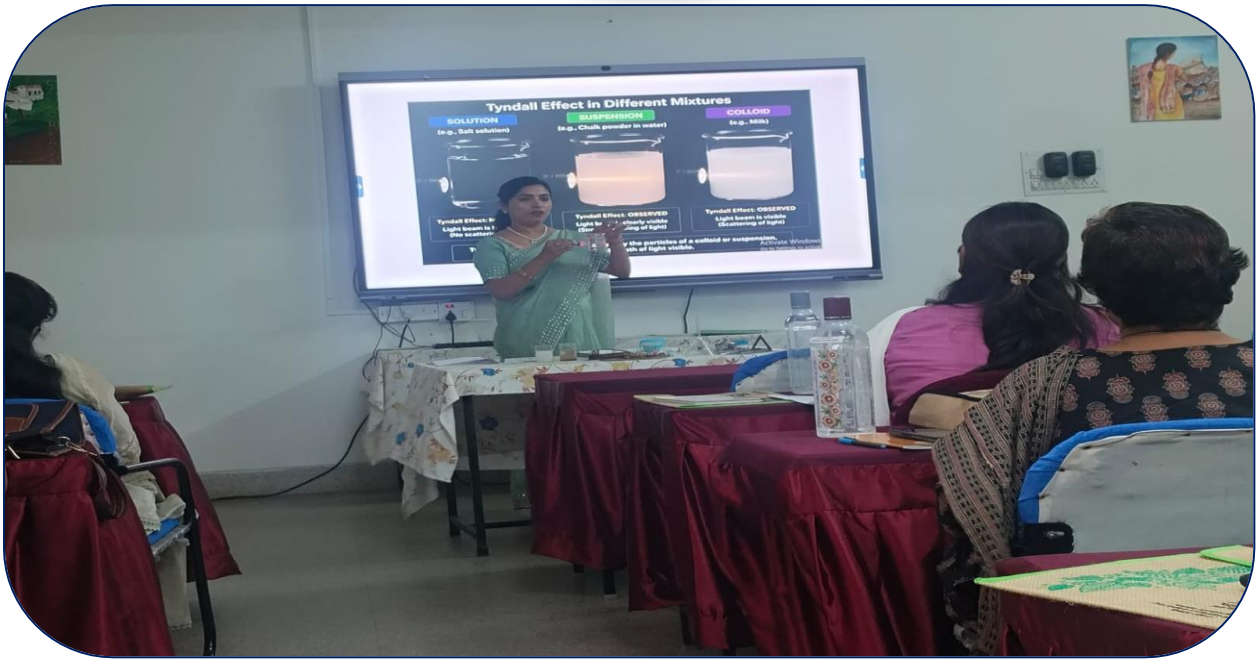
Resource Person: Smt. Ushma Teotia Ma'am

This interactive session was filled with engaging activities such as the Wonder Jar and "Can You See Sound?" using simple household materials. The session emphasized inquiry-based learning, encouraging participants to ask meaningful questions before seeking answers. After lunch, participants categorised various statements into evidence, opinion, or needs more data, followed by a discussion on experiential learning and its significance in science education.

SESSION 3: Exploring the New Class IX Science Textbook

Resource Person: Smt. Renu Dubey Ma'am

Ma'am explained the key differences between the old and the new Class IX Science textbook. Participants performed hands-on activities demonstrating the **Tyndall effect in different mixtures**, **purification of water using alum**, and **electron distribution in atomic shells**. She also introduced the new textbook features such as **Think It Over, Meet a Scientist, Pause and Ponder, Ready to Go Beyond, Bridging Science and Society, Think as a Scientist,** and **Revise, Reflect and Refine**, explaining their effective classroom use.



SESSION 4: Preparation and Observation of Plant and Animal Cells

Taken by: Matthew Sir

In the final session, Sir demonstrated the preparation of **onion peel** and **cheek cell** slides. Participants observed both plant and animal cells under the microscope and learnt the step-by-step procedure for preparing temporary slides, helping them understand the structural differences between the two cell types.

Conclusion

The day's sessions were highly interactive, activity-based, and enriching. They provided valuable insights into the vision of the new science curriculum, inquiry-based pedagogy, experiential learning, and the innovative features of the *Exploration* textbook, equipping participants with practical strategies for effective science teaching.

REPORT FOR DAY-2 (21-07-2026)

The second day of the Orientation Programme on the New Science Textbook for Class IX commenced with a beautiful assembly conducted by teachers of **group 1**. An interesting science-based activity was incorporated into the prayer assembly, creating an engaging and enthusiastic atmosphere for all the participants under the guidance of **Course Director, Dinesh Kumar Sir.**

Following the prayer, **Shri P. I. T. Raja, Deputy Commissioner, KVS Bengaluru Region,** addressed the participants and highlighted the effective implementation of the new Science curriculum. He emphasized activity-based teaching, especially in Physics, and encouraged teachers to apply the learning from the orientation programme in their classrooms. He stressed identifying academically weaker students, preparing effective lesson plans, staying updated on school performance, and pursuing continuous professional development. He also explained the teacher inspection proforma, encouraged sharing of teaching experiences, and reiterated the importance of providing a safe, positive, and child-friendly learning environment free from corporal punishment.

Conducted by: Mrs. Renu Dubey, Resource Person

In the first session, Mrs. Renu Dubey explained Inquiry-based learning as a student-centred approach where learners actively ask questions and construct their own understanding, using the example of the role of surface area in evaporation.

She conducted inquiry-based activities on biodiversity, motion, pressure belts and planetary winds, gravitation, and a handmade pendulum, encouraging teachers to frame inquiry-based questions. She also demonstrated the electrical conductivity of ionic and covalent compounds using salt, sugar, naphthalene balls, and camphor. The session highlighted how inquiry-based and experiential learning can make science teaching more engaging and effective.

SESSION-II - Topic- "5E Instructional Model"

Conducted by: Mrs. Arti Prasad, Assistant Course Director

In the second session, **Mrs. Aarti Prasad,** explained the **5E Instructional Model—Engage, Explore, Explain, Elaborate, and Evaluate**. She highlighted the importance of

each stage in promoting curiosity, process skills, questioning, collaboration, and active learning. She explained the specific roles of both teachers and students at every stage and suggested suitable classroom activities for effective implementation.

Using the chapter "Journey Inside the Atom" as an example, she demonstrated how learning should begin with the observation of a phenomenon, followed by questioning, scientific enquiry, investigation, experimentation, recording and analysing observations, collaborative learning, and the development of a scientific attitude. She also emphasized the importance of teacher reflection to continuously improve classroom practices. The session effectively demonstrated how the 5E Model can make science learning more inquiry-based, engaging, and meaningful.

SESSION-III- Topic- "Competency Mapping of the New NCERT Science Textbook (Exploration – Grade IX)."

Conducted by: Mrs. Gauri Roy, Guest Resource person, PGT Physics, RIE Mysore

In the third session, Mrs. Gauri Roy, focused on the "Competency Mapping of the New NCERT Science Textbook." She explained how the new textbook is aligned with NEP 2020 and the National Curriculum Framework for School Education (NCF-SE) 2023, focusing on competency-based, inquiry-based, experiential, and inclusive learning.

She highlighted the objectives of the new Science curriculum, including the development of conceptual understanding, scientific practices, scientific communication, critical thinking, scientific attitude, and 21st-century skills. She also explained the competencies and cross-cutting competencies included in the Class IX textbook, along with core values such as curiosity, scientific temper, careful observation, critical thinking, collaboration, respect for evidence, responsibility, and perseverance through examples from different chapters.

SESSION-IV - Topic- “Connecting Science with real life STEM Integration, Sustainability, Local Context”

Conducted by: Mrs. Ushma Teotia, Resource Person

In the fourth session, Mrs. Ushma Teotia, elaborated on "Connecting Science with Real Life through STEM Integration." She explained how the new Science textbook integrates STEM (Science, Technology, Engineering, and Mathematics) to make learning meaningful and relevant. Through activities such as "Science in My Bag" and STEM Mapping, etc., she demonstrated how everyday objects can be used to teach scientific concepts.

She emphasized that connecting science with real-life situations help students understand and remember concepts more effectively. The session also highlighted the importance of sustainability, local context, and Indian Knowledge Systems, including the contributions of Indian scientists. She encouraged teachers to use real-life activities to make science learning engaging, practical, and competency-based.

REPORT FOR DAY-3 (22-07-2026)

Presented by: Group 3 **Venue:** ZIET MYSURU

Morning Assembly & Opening Session

The day commenced on an inspiring note with a morning assembly efficiently conducted by **Team 2**:

- **News Headlines:** Shared by Shilpi Ma'am.
- **Pledge:** Administered by Prashant Sir.
- **Thought for the Day:** Delivered by Ramesh Sir.
- **Special Activity:** A light hearted science joke presented by Noble Sir to kickstart the day's learning with humour and enthusiasm.

Following the assembly, **Chitra Lekha Ma'am** presented a concise recap of Day 2 activities, setting a clear context for the day's learning objectives.

Technical Sessions Overview

Session 1 "Designing Quality Assessment Tasks" — MA'AM Ushma Teotia

Mr. Dinesh sir opened the academic discourse by focusing on **Experiential Learning**. He guided participants through the core cycle: *Link, Engage, Explore, and Explain*. He emphasized:

- The **Five-Fold Development** framework and its practical terms.
- Brainstorming methods to spark critical thinking in science classrooms.
- Adding tangible value to teaching through relatable, real-life examples and an activity on **Density**.

Ma'am Ushma Teotia led a session on **"Designing Quality Assessment Tasks"**, emphasizing that *if teaching methods change, testing methods must evolve alongside them*. Key highlights included:

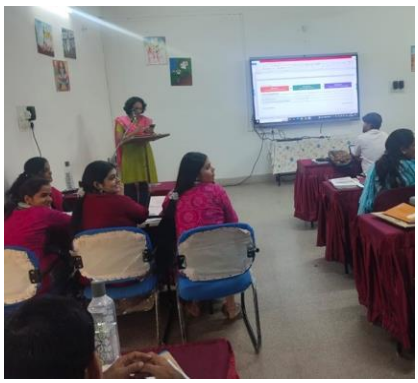
- **Activity 1 — Answer Key Trap:** Designing questions that encourage students to pause, reflect, and evaluate rather than recall directly.
- **Activity 2 — Distractor Doctor:** Techniques for creating robust, competency-based MCQs and understanding the anatomy of a quality case-based question (*Short Stimulus → Recall → Level Opener → Application Sub-question → Reasoning Closure*).
- **Activity 3 — Build a Case based Question:** An interactive, hands-on session where candidates actively collaborated to draft case based questions.

Session-2 Practical Applications

Throughout the day, participants observed engaging demo sessions:

- **Prashant Sir** delivered an insightful demo lesson prior to the lunch break.
- **Yogesh Tomar Sir** presented a highly effective demo lesson during the post-lunch session.

- **Adhira Ma’am** conducted an engaging demo on the topic **"Sound with Fun Activity,"** showinghow abstract concepts can be made vibrant through play.


Session 3 — Improvement in Quality Assessment — Ma’am Aarti Prasad
Ma’am Aarti Prasad, Assistant Course Director, facilitated an illuminating session on **"Improvement in Quality Assessment."** The session highlighted:

- Shifting the focus of evaluation from rote memorization toward **competency-based mastery**.
- Deconstructing **rubrics**—their core criteria, performance levels, and tangible benefits in ensuring fair grading, consistent moderation, and actionable feedback.
- Practical application using **Class 9, Chapter 3** walking through identification diagrams, comparative analysis, and clear rubrics assessment.
- The vital key takeaway: **Sharing rubrics directly with students** empowers them to take ownership of their own learning outcomes.

Vote of Thanks on Behalf of Group 3

On behalf of **Group 3**, we express our sincere gratitude to the leadership and resource persons at **ZIET** for organizing such an enriching, interactive, and practical orientation program.

A special thanks to **Mr. Dinesh sir, Ma'am Aarti Prasad**, **Ma'am Ushma Teotia**, and **Ma'am Renu Dubey** for their deeply insightful sessions.

We also extend our appreciation to all demo presenters—**Prashant Sir, Yogesh Sir, and Adhira Ma'am**

The takeaways from yesterday —from the *Distractor Doctor* approach to transparent *Rubric Design*—will undoubtedly transform our science classrooms.

Thank you

REPORT FOR DAY-4 (23-07-2026)

Presentation by: Group 4

The third day of the orientation on New Textbook at ZIET Mysuru, began with an inspiring morning assembly conducted by **Group 3**. The assembly set a positive tone for the day's learning through various engaging activities.

Morning Assembly

- Daily report presentation
- News headlines
- Thought for the day
- Pledge
- Special presentation
- Introduction of a new word

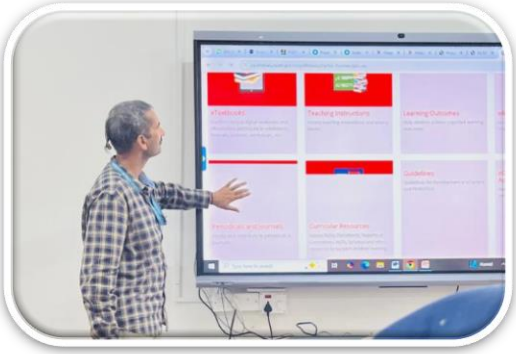
Session 1: Convex and Concave Mirrors & Lenses

Coordinator: Mr. Dinesh Sir

Mr. Dinesh conducted an engaging session on **Convex and Concave Mirrors and Lenses**, demonstrating scientific concepts through simple classroom materials.

Key Highlights

- Demonstrated the path of light rays using a piece of paper.
- Explained focal points and image formation.
- Showed how low-cost Teaching-Learning Materials (TLMs) can simplify difficult concepts.
- Promoted experiential and activity-based learning.



Session 2: Digital Resources in Education

Resource Person: Ms. Ushma Teotia Ma'am

The session focused on integrating digital resources effectively into classroom teaching while ensuring responsible and ethical use of technology.

Key Highlights

- Digital resources should be integrated into lesson plans rather than used as add-ons.

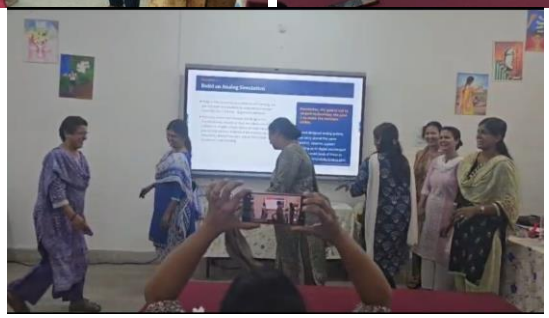
- Demonstration of **eyes.nasa.gov** for interactive exploration of the solar system.

- Use of virtual laboratories and simulations for concept visualization.
- Alternative analog activities for schools with limited internet connectivity.
- Discussion on ethical use of Artificial Intelligence and student data privacy.
- Demonstrated integration of NCERT textbook QR codes into lesson plans.

Hands-on Group Presentations

Participants demonstrated competency-based teaching through collaborative presentations.

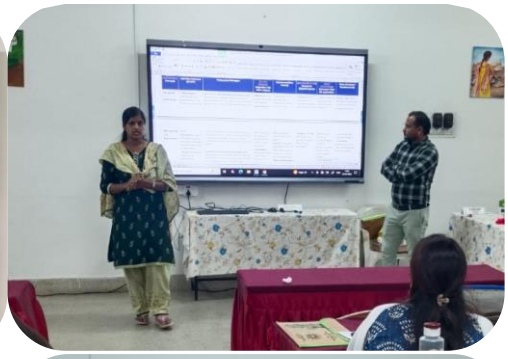
Group 1: Pollination in Plants
Group 2: Rutherford's Atomic Model
Group 3: Compression and Rarefaction in Waves

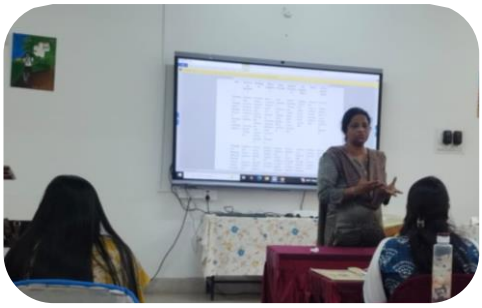


Micro-Teaching and Demonstration Lessons

Several participant groups presented innovative classroom teaching strategies.

Topic	Presenters
Plant and Animal Tissues	Ramesh Sir & Sahana Mam
Sound Waves	Sheena Mam & Adhira Mam
Effects of Force on Motion	Shilpi Mam & Priyali Mam
Mixtures and Separation Techniques	Sheena Mam & Jayant Sir
Work, Energy and Simple Machines	Anjali Mam & Geeta Mam



Session 3: Managing Classroom Diversity

Resource Person: Ms. Renu Dubey Ma'am

The concluding session emphasized creating inclusive classrooms where every learner is valued and provided equal opportunities to participate.

Key Takeaways

- Recognize and celebrate learner diversity.
- Encourage students to express ideas through:
  - Visual representations

    - Verbal explanations
    - Experiments
    - Practical activities
- Interdisciplinary demonstrations included:
    - Nitrogen cycle
    - Root nodules
    - Plant pigments (chlorophyll and anthocyanin)
- Experimental demonstration of the **Law of Conservation of Mass**.
- Reinforced inclusive, competency-based, and experiential teaching practices.



Demo Lessons

A beautiful lesson plan was delivered on the chapter reproduction by **Shweta ma'am** and **Vaibhav Sir**

Conclusion

The third day of the orientation programme provided valuable exposure to:

- Competency-based teaching practices.
- Effective integration of digital resources.

- Inclusive classroom management strategies.
- Activity-based and experiential pedagogy.
- Collaborative learning through group presentations and micro-teaching.

Overall, the sessions were interactive, practical, and enriching, equipping participants with innovative approaches to make science teaching more engaging, learner-centred, and meaningful.

REPORT FOR DAY-5 (24-07-2026)

Presented by: Group 5

The fifth day of the ZIET Orientation Programme on the **New NCERT Science Textbooks** commenced with an inspiring morning assembly conducted by **Group 4**. The assembly set a positive tone for the day's learning through the presentation of the

- Daily report
- News headlines
- Thought for the day
- Pledge
- A special presentation
- Word of the Day

Session 1: Science Activity

The first session of the day was presented by **Mr. Dinesh Sir**, who demonstrated an engaging science activity based on **pressure difference**. Through this activity, he explained various scientific concepts including **density, surface tension, evaporation, volcanic eruptions, and interdisciplinary applications of science**, while relating them to everyday life situations.

Mr. Dinesh Sir further discussed the concepts of **persistence of vision, persistence of hearing, ultrasonic sound, and infrasonic sound**, illustrating each with practical examples from daily life. He also emphasized the importance of fostering a strong **student–teacher relationship**, building emotional connections with learners, and introduced the concept of **Panch Kosha Sadhana** for the holistic development of students.

Session 2: Micro Teaching by Teachers

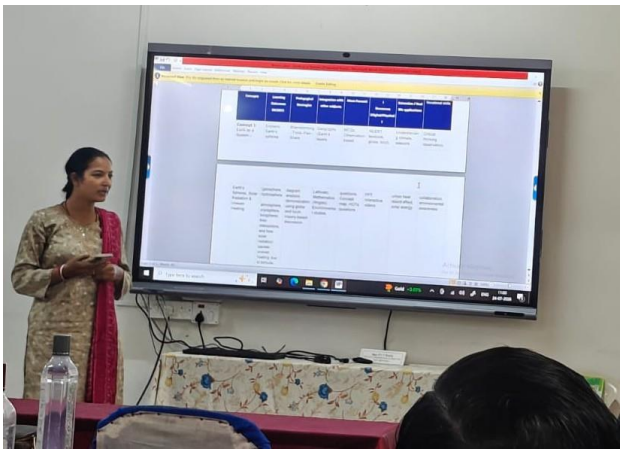
- **Micro-Teaching and Demonstration Lessons**

- Several participant groups presented innovative classroom teaching strategies.

Topic	Presenters
Atomic Foundation of Matter	Subhadra Sankar C Resishmi Swapna Sudhakaran

Topic	Presenters
Describing Motion Around Us	Shikha Kumari Mathew Chacko
Earth as a System Energy, Matter and life	Chitra Lekha Sharma
Journey inside the atom	Noble V Sebastian






Session 3: Advance Science Curriculum

The third session was conducted by **Mr. Dinesh Sir** on the newly introduced **Advanced Science** curriculum for **Class IX**. The session focused on strengthening participants' conceptual understanding of fundamental topics through interactive discussions and real-life examples.

The session covered important concepts including:

- Physical quantities and their measurement
- Motion and the significance of a reference point in defining motion
- Periodic and non-periodic motion
- Linear, two-dimensional, and three-dimensional motion
- Scalar and vector quantities


Mr. Dinesh Sir also explained the **variation in acceleration due to gravity** with changes in height from the Earth's surface, helping participants understand how gravitational acceleration is not constant under all conditions.
To make the concepts more meaningful, he illustrated the ideas of **centre of mass, force, and torque** using familiar real-life situations and everyday examples. These demonstrations enabled participants to visualize abstract concepts and appreciate their practical applications in daily life.
The session effectively integrated conceptual clarity with experiential learning, encouraging teachers to adopt activity-based and context-driven pedagogical approaches while teaching the newly introduced topics in the Class IX Science curriculum.

Following the sessions, the **Valedictory Function** was held to mark the successful conclusion of the **ZIET Orientation Programme on the New NCERT Class IX Science Textbook**. The programme included participants' feedback, sharing of experiences, distribution of certificates, and concluding remarks by the dignitaries. The resource persons and organizers encouraged all participants to implement the learner-centred, competency-based, and experiential teaching approaches discussed during the orientation. The function concluded with a formal **vote of thanks**, expressing gratitude to the Course Director, resource persons, organizing team, and all participants for making the five-day orientation programme a meaningful and enriching learning experience.

SESSIONS

(20/07/2026 - 24/07/2026)

SESSION -1

DAY -1(20/07/2026)

UNDERSTANDING THE VISION BEHIND THE NEW SCIENCE TEXTBOOK

BY - Mr. Dinesh Kumar (PGT PHYSICS- Course Coordinator, KVS ZIET Mysuru)

This session was taken by course coordinator **Mr. Dinesh Kumar Sir,** which mainly focused on the **vision and philosophy underpinning the development of the new science textbooks.** Through thought-provoking questions such as **Why does a pressure cooker cook food faster? or why do spectacles fog during winter?** that explored the fundamental nature of science, Sir also encouraged active participation and critical thinking among the participants. The session emphasized the objectives of science education, the significance of developing **21st-century skills,** and the transition from traditional, teacher-centered classrooms to modern, learner-centered approaches. He also highlighted the relevance and application of science in everyday life by drawing examples from familiar settings such as kitchens, gardens, hospitals, markets, and various other real-world contexts.

He further explained that the new Science textbooks, developed under **NEP 2020 and NCF-SE 2023,** aim to shift science Education from rote memorization to meaningful, competency-based learning. Their focus is on developing scientific literacy, critical thinking, problem-solving skills, and the real-life application of scientific concepts.

KEY POINTS OF THE SESSION:

- NEP 2020 and NCF-SE 2023 as the foundation.
- Development of Scientific Literacy.
- Emphasis on Competency-Based Learning.
- Shift from Rote Learning to Conceptual Understanding.
- Focus on Critical Thinking and Problem Solving.

- Promotion of Inquiry and Experiential Learning.
- Learner-Centered teaching approach.
- Application of science in Real-Life Situations.
- Development of Scientific Temper and Life Skills.
- Preparing Responsible and Future-Ready Citizens.

Conclusion:

The new *Exploration textbook* for class IX marks a paradigm shift in Science education- from rote learning to active, competency-based learning. It invites both teachers and students to participate in a journey of joyful discovery, reflection and lifelong learning, embodying the spirit of NEP 2020 and NCF-SE 2023.

SESSION -2

DAY -1(20/07/2026).

APPRECIATE HOW CHILDREN LEARN SCIENCE: INQUIRY, CURIOSITY, CRITICAL THINKING, EXPERIENTIAL LEARNING

BY - Mrs. Ushma Teotia,

TGT Science,

PM SHRI Kendriya Vidyalaya No.2 AFS,

Jalahalli East, Bengaluru. (Resource person).

The session, conducted by Mrs. Ushma Teotia, the resource person for the workshop, was highly interactive and engaging. It featured thought-provoking activities such as the **Wonder Jar** and **"Can You See Sound?"**, using simple household materials to demonstrate scientific concepts. The resource person emphasized the importance of inquiry-based learning, encouraging participants to ask meaningful questions before seeking answers. After the lunch, session was resumed in which participants classified various statements into **evidence**, **opinion**, or **needs more data activity**, fostering critical thinking and scientific reasoning. The session concluded with an insightful discussion on experiential learning and its vital role in making science education more meaningful, engaging, and learner-centered. The session also emphasizes that effective inquiry-based teaching is possible even in large classrooms using simple, low-cost materials and concludes with practical strategies that teachers can immediately implement in their classrooms.

Key points of the session:

- Learning starts with curiosity and questioning.
- Focus shifts from rote learning to competency-based learning.
- Follow Question → Observe → Explore → Explain → Apply.
- Promote Inquiry-Based Learning (Confirmation, Structured, Guided & Open Inquiry).
- Encourage critical thinking through evidence, not memorization.
- Use experiential learning: Experience → Reflect → Concept → Apply.
- Create a classroom culture that values wonder, discussion, and investigation.
- Teachers act as facilitators, while students become active learners.

Conclusion:

The session successfully highlighted that meaningful science learning begins with curiosity, questioning, and active exploration rather than rote memorization. Through engaging activities and practical demonstrations, Mrs. Ushma Teotia inspired participants to adopt inquiry-based and experiential teaching approaches that foster critical thinking, scientific reasoning, and problem-solving skills. The session reinforced that effective science education can be achieved using simple, low-cost resources, making learning accessible, engaging, and learner-centered. Participants left the session equipped with practical strategies to create interactive classrooms where students observe, investigate, reflect, and apply scientific concepts in real-life situations, thereby nurturing lifelong scientific temper and curiosity.

Session -3

DAY -1(20/07/2026

ANALYSE CHAPTER DESIGN AND LEARNING PROGRESSION: LEARNING OUTCOME, ACTIVITIES, PROJECT, QR CODES, ASSESSMENTS.

BY - Mrs. Renu Dubey

TGT Science,

PM Shri KV Bolarum, Hyderabad Region

SESSION OVERVIEW

The session, led by Smt. Renu Dubey Ma'am, Resource person, provided valuable insights into the structure and pedagogical approach of the new Class IX Science textbook in comparison with the previous edition. Through an engaging discussion, she highlighted the significant changes introduced to promote **conceptual understanding, inquiry-based learning, and the development of scientific thinking** among students.

The session included a series of hands-on activities, where participants explored the **Tyndall effect using different mixtures, demonstrated water purification with alum, and understood the distribution of electrons in atomic shells through interactive models.** These activities emphasized experiential learning and encouraged active participation.

Ma'am also familiarized the participants with the innovative features incorporated in the new textbook, including **Think It Over, meet a Scientist, Pause and Ponder, Ready to Go Beyond, Bridging Science and Society, think as a Scientist, and Revise, Reflect and Refine.** She explained how these features can be effectively integrated into classroom teaching to foster curiosity, critical thinking, scientific inquiry, and meaningful connections between science and everyday life.

Other highlights of the session:

- Chapter structure follows: Engage, Explore, Explain, Apply and Assess.
- Encourages observation, questioning, investigation, collaboration, and scientific reasoning.
- QR codes provide videos, virtual labs, quizzes, and additional learning resources.
- Learning outcomes focus on knowledge, skills, values, and application.
- Competency-based assessment includes formative, practical, self, peer, and summative assessment.
- Teachers act as facilitators, while students become active learners.
- The overall aim is to develop scientifically literate learners who can apply concepts to solve real-life problems rather than simply recall information.

Conclusion:

The session provided participants with a comprehensive understanding of the design, structure, and learning progression of the new Class IX Science textbook. Through interactive activities and detailed discussions, Smt. Renu Dubey Ma'am demonstrated how the revised textbook promotes competency-based, inquiry-driven, and experiential learning. The session highlighted the effective integration of innovative textbook features, digital resources, and diverse assessment strategies to enhance conceptual understanding and scientific thinking. It reinforced the teacher's role as a facilitator in creating engaging, learner-centered classrooms that encourage exploration, collaboration, and the application of scientific concepts to real-life situations. Overall, the session equipped participants with practical insights and strategies for the effective implementation of the new curriculum, ensuring a more meaningful and enriching science learning experience for students.

Session -4

DAY -1(20/07/2026).

DEMO TEACHING BY PARTICIPANT TEACHER

BY - Dr. Mathew Chacko (TGT Science,

PM Shri KV Bolarum, Bengaluru Region)

The final session was conducted by Dr. Mathew Sir as a **demonstration lesson**, showcasing effective classroom teaching strategies for the **topic Cell – Structure and Functions.** Through a well-organized practical demonstration, Sir explained the step-by-step procedure for preparing **temporary slides of onion peel (plant cell) and human cheek cells (animal cell).**

Participants actively observed the prepared slides under the microscope and compared the structural features of plant and animal cells, identifying components such as the cell wall, cell membrane, nucleus, and cytoplasm. The demonstration emphasized correct laboratory techniques, proper handling of specimens and microscopes, and the importance of observation skills in biology.

The session served as an excellent model of **activity-based teaching, illustrating how practical demonstrations can enhance conceptual understanding,** promote

student engagement, and make classroom learning more interactive and meaningful.

Conclusion

The demonstration lesson by Dr. Mathew Sir effectively showcased how practical, activity-based teaching can strengthen students' understanding of scientific concepts. By guiding participants through the preparation and observation of temporary slides, the session reinforced the importance of hands-on learning, accurate laboratory practices, and careful scientific observation. It demonstrated how experiential activities can make abstract concepts more tangible, encourage active participation, and foster scientific inquiry. Overall, the session provided participants with valuable pedagogical strategies to conduct engaging biology practical and create interactive, learner-centered science classrooms.

Session -1

DAY -2(21/07/2026)

EXPERIENCE INQUIRY-BASED SCIENCE TEACHING: CONSTRUCTIVISM, EXPERIENTIAL LEARNING, QUESTIONING, OBSERVATION

BY - Mrs. Renu Dubey (TGT Science, PM Shri KV Bolarum, Hyderabad Region

Session Overview

The session provided an in-depth orientation to the newly introduced NCERT Class IX Science textbook, highlighting the shift towards **Inquiry-Based Learning (IBL), Constructivist pedagogy, and Experiential Learning.** It emphasized creating student-centered classrooms where learners actively construct knowledge through observation, questioning, investigation, experimentation, and evidence-based reasoning rather than rote memorization. Through subject-specific examples, classroom activities, and real-life contexts, the session demonstrated how the revised curriculum integrates scientific inquiry across chapters such as Matter in Our Surroundings, Motion, Tissues, Gravitation, Work and Energy, and Natural Resources. Teachers were encouraged to facilitate learning by nurturing curiosity, promoting critical thinking, fostering collaborative learning, and guiding

students to develop conceptual understanding through hands-on experiences and meaningful scientific exploration.

Key Points of The Session

•Introduced the pedagogical vision of the new NCERT Class IX Science curriculum centered on Inquiry-Based and Experiential Learning.

•Emphasized the teacher's role as a facilitator who guides students through questioning, investigation, and reflection.

•Highlighted Constructivism as the foundation for enabling students to build knowledge through active engagement and prior experiences.

•Demonstrated the integration of inquiry activities across major Science chapters using real-life situations and hands-on investigations.

•Showcased the importance of scientific observation, data collection, evidence-based reasoning, and drawing logical conclusions.

•Encouraged the use of higher-order questioning techniques to develop curiosity, critical thinking, problem-solving, and scientific temperament.

•Reinforced collaborative learning through group discussions, exploration, experimentation, and peer interaction.

•Promoted the integration of classroom learning with everyday experiences to make scientific concepts relevant, meaningful, and application-oriented.

•Encouraged teachers to adopt activity-based and competency-focused teaching practices aligned with the objectives of the revised NCERT curriculum.

Conclusion

The session effectively reinforced the vision of the new NCERT Science curriculum by demonstrating how inquiry, observation, experimentation, and reflective questioning can transform classroom teaching into an engaging and meaningful learning experience. It inspired teachers to adopt learner-centered pedagogical practices that cultivate scientific temper, conceptual clarity, critical

thinking, and problem-solving abilities. The practical strategies and classroom examples shared during the session will support teachers in implementing the revised curriculum effectively while fostering curiosity, creativity, and lifelong learning among students.

Session -2

DAY -2(21/07/2026)

MICRO-TEACHING PRACTICE TEACHING 5E MODEL

By – Mrs. Arti Prasad

TGT (Science)
Kendriya Vidyalaya, NAL Campus, Bengaluru Region

ASSOCIATE COURSE DIRECTOR

Session Overview

The 5E Instructional Model is a student-centered teaching approach that promotes active learning through five sequential phases: **Engage, Explore, Explain, Elaborate, and Evaluate.** It begins by capturing learners' interest and activating their prior knowledge through thought-provoking questions or demonstrations. Students then explore concepts through hands-on investigations, collaborative activities, and inquiry-based learning with minimal direct instruction. During the Explain phase, learners construct and communicate their understanding using evidence, while the teacher facilitates discussions, clarifies misconceptions, and introduces formal scientific concepts. In the Elaborate phase, students extend and apply their learning to new situations, strengthening conceptual understanding and problem-solving skills. Finally, the Evaluate phase assesses students' conceptual understanding, scientific reasoning, and skill development through diverse assessment strategies such as quizzes, performance tasks, projects, portfolios, and reflective activities. Overall, the 5E model encourages curiosity, critical thinking, collaboration, and meaningful learning by actively engaging students throughout the learning process.

Key Points

Engage: Captures students' attention, activates prior knowledge, and stimulates curiosity through questions, demonstrations, brainstorming, or reading activities.

Explore: Students investigate concepts through hands-on activities, collaborative learning, experimentation, and problem-solving while the teacher acts as a facilitator.

Explain: Students present their ideas and reasoning using evidence, followed by teacher guidance to introduce accurate concepts, definitions, and scientific terminology.

Elaborate: Learners apply their knowledge in new contexts, make decisions, solve problems, and connect concepts with real-life situations to deepen understanding.

Evaluate: Assessment is continuous and includes quizzes, open-ended questions, performance tasks, rubrics, portfolios, peer assessment, and self-reflection to measure conceptual understanding and learning progress.

The model promotes inquiry-based, competency-focused, and learner-centered education, encouraging students to become active participants in the learning process rather than passive recipients of information.

Conclusion: -

The 5E Instructional Model provides a systematic and learner-centered framework that transforms the teaching-learning process into an engaging, inquiry-driven experience. By progressing through the stages of Engage, Explore, Explain, Elaborate, and Evaluate, students actively construct knowledge, develop scientific reasoning, apply concepts in real-life contexts, and reflect on their own learning. The model promotes critical thinking, collaboration, creativity, and competency-based learning while enabling teachers to facilitate meaningful and lasting conceptual understanding through continuous assessment and active student participation.

Session -3

DAY -2(21/07/2026)

COMPETENCY MAPPING OF THE NEW SCIENCE TEXTBOOKS: ALIGNING CHAPTERS WITH CONCEPTS, SCIENTIFIC PRACTICES, AND CORE VALUES

BY – Mrs. GAURI ROY

PGT Physics,

Regional Institute of Education (RIE),

NCERT, Mysuru

(Guest Lecture)

Session Overview

The guest lecture by **Mrs. Gauri Roy** provided participants with an in-depth understanding of the competency-based framework underpinning the newly introduced **NCERT Class IX Science textbook, Exploration**. The session focused on the philosophy of **NEP 2020** and **NCF-SE 2023**, explaining how the revised curriculum shifts science education from content memorization to competency development. Participants were introduced to the concept of competency mapping, where scientific concepts are integrated with scientific practices, core values, and learning outcomes to promote holistic development. The session also demonstrated how teachers can effectively translate curriculum goals into meaningful classroom experiences that foster inquiry, scientific reasoning, and lifelong learning.

Key Highlights of the Session

1. Vision of NEP 2020 and NCF-SE 2023

The resource person explained that the new science curriculum has been developed to realise the vision of **NEP 2020**, which aims to nurture creative, critical, and responsible learners through equitable, inclusive, and holistic education. The **NCF-SE 2023** translates this vision into classroom practices by emphasizing competency-based, experiential, and learner-centered education.

2. Why the New Science Textbook?

Participants learnt that the new textbook has been designed to:

- Shift from content-based learning to competency-based learning.
- Promote inquiry, experimentation, and scientific thinking.
- Encourage multidisciplinary and experiential learning.
- Develop creativity, problem-solving ability, and scientific temper.
- Prepare learners for responsible citizenship rather than only examinations.

3. Understanding Competency-Based Education

Mrs. Roy elaborated on the meaning of competencies as integrated abilities that combine knowledge, skills, values, attitudes, and scientific practices. She clearly distinguished between **competencies** and **learning outcomes**, explaining that competencies represent long-term capabilities, while learning outcomes are observable indicators demonstrating those competencies.

4. Competencies in Science

The session highlighted the major competencies expected from learners, including:

- Inquiry and scientific investigation
- Observation and experimentation
- Data collection, organization, and interpretation
- Scientific reasoning and evidence-based conclusions
- Scientific modelling
- Scientific communication using appropriate terminology and representations

Teachers were encouraged to design classroom experiences that enable students to actively develop these competencies through exploration and investigation rather than passive learning.

5. Essential Shift in Science Education

The resource person emphasized that science should no longer be treated as a collection of isolated facts. Instead, classrooms should help learners understand scientific processes, investigate real-life phenomena, ask meaningful questions, and construct explanations based on evidence. The curriculum encourages students to move progressively from concrete experiences to abstract scientific concepts.

6. Unique Features of the New Textbook

Participants were introduced to the distinctive features of the *Exploration* textbook, such as:

- Inquiry-based learning
- Activity-rich pedagogy
- Observation before theory
- Contextual and interdisciplinary learning
- Everyday science applications
- Reflection questions
- Integration of scientific practices throughout the chapters
- Indian examples and real-life contexts

These features support meaningful learning while connecting classroom concepts with students' everyday experiences.

7. Competency Mapping with Chapters

The session demonstrated competency mapping using examples from:

- **Chapter 2 – Cell: The Building Block of Life**
- **Chapter 7 – Work, Energy and Simple Machines**

Mrs. Roy explained how each chapter integrates:

- Scientific concepts
- Scientific practices
- Core values and dispositions
- Competency development
- Learning outcomes

Participants appreciated how every chapter has been carefully designed to nurture curiosity, scientific temper, critical thinking, collaboration, accuracy, perseverance, respect for evidence, responsible use of resources, and scientific communication.

Major Takeaways

- Competency-based education focuses on developing learners who can apply scientific knowledge in real-life situations.
- Learning outcomes are derived from competencies and provide measurable evidence of student learning.

- Effective science teaching requires inquiry, experimentation, observation, reflection, and discussion.
- Classroom assessment should evaluate conceptual understanding, scientific practices, values, and problem-solving abilities rather than rote memorization.
- Teachers play the role of facilitators who guide learners in constructing knowledge through active participation.
- The *Exploration* textbook effectively aligns curriculum, pedagogy, assessment, and values with the objectives of NEP 2020 and NCF-SE 2023.
- Scientific education should nurture lifelong learners who are curious, responsible, ethical, and capable of addressing real-world challenges.

Conclusion

The guest lecture by **Mrs. Gauri Roy** provided participants with a comprehensive understanding of competency mapping and its significance in implementing the new NCERT Class IX Science textbook effectively. The session successfully connected the vision of **NEP 2020** and **NCF-SE 2023** with practical classroom strategies, enabling teachers to appreciate the shift from traditional content delivery to competency-based, inquiry-driven learning. By highlighting the integration of concepts, scientific practices, learning outcomes, and core values, the session reinforced the importance of developing scientifically literate learners who can think critically, investigate independently, and apply scientific knowledge responsibly in everyday life. Overall, the lecture equipped participants with valuable pedagogical insights and practical approaches for creating engaging, learner-centered science classrooms that promote curiosity, innovation, and lifelong learning.

SESSION -4

DAY -2(21/07/2026).

CONNECTING SCIENCE WITH REAL LIFE AND OTHER DISCIPLINES: STEM, SUSTAINABILITY, LOCAL CONTEXT

BY - Mrs. Ushma Teotia,

TGT Science,

PM SHRI Kendriya Vidyalaya No.2 AFS,

Jalahalli East, Bengaluru. (Resource person).

Session Overview

The session, "Connecting Science with Real Life," focused on transforming science teaching from content-based instruction to context-driven, experiential learning. It emphasized that scientific concepts become more meaningful and long-lasting when connected to students' everyday experiences, local surroundings, and real-world applications. Teachers were introduced to strategies for integrating **STEM education, sustainability, local context, Indian Knowledge Systems, and career awareness** into classroom practices through low-cost, activity-based approaches. Interactive activities demonstrated how ordinary objects, local resources, and community experiences can be effectively used to make science engaging, relevant, and competency-oriented, in alignment with the objectives of the new Exploration textbook.

Key Highlights

***Real-Life Contextualization:** Emphasized linking scientific concepts with students' daily experiences to promote meaningful and lasting learning.

***Integrated STEM Approach:** Demonstrated how Science, Technology, Engineering, and Mathematics can be seamlessly connected within every topic through STEM mapping activities.

***Sustainability as a Cross-Cutting Theme:** Encouraged embedding environmental awareness and sustainable practices across different science chapters using authentic local data.

***Local Context and Indian Knowledge Systems:** Highlighted the integration of local occupations, community resources, Indian scientific heritage, and indigenous knowledge to make learning culturally relevant.

***Career-Oriented Science Education:** Encouraged teachers to connect scientific concepts with diverse professions, helping students recognize science as a pathway to future careers.

***Low-Cost, Activity-Based Pedagogy:** Showcased innovative, zero-cost classroom activities using everyday materials to enhance experiential and competency-based learning.

***Practical Classroom Implementation:** Provided simple, time-efficient strategies for integrating real-life examples despite constraints such as limited resources, time, and diverse classroom contexts.

Conclusion: -

The session concluded by reinforcing that science learning becomes more effective, engaging, and meaningful when it is connected with students' everyday experiences, local surroundings, and real-life applications. Teachers were encouraged to adopt integrated STEM practices, embed sustainability across topics, utilize local resources and Indian Knowledge Systems, and promote career awareness through activity-based, competency-oriented pedagogy. By incorporating these practical and contextual teaching strategies, educators can foster scientific inquiry, critical thinking, and deeper conceptual understanding, thereby aligning classroom practices with the vision of the new Exploration curriculum.

SESSION -1

DAY -3(22/07/2026).

Today's session was initiated by **Mr. Dinesh Kumar**, the Course Director. He delivered an informative session on the fundamental concepts of Physics. The topics covered included **Ohm's Law, resistance, potential energy, electric current, voltage**, and other basic physics concepts. He explained each concept in a simple and systematic manner, ensuring that everyone developed a clear understanding of the fundamentals. The session strengthened our basic knowledge and laid a strong foundation for learning advanced topics in Physics.

DESIGNING QUALITY ASSESSMENT TASKS

BY - Mrs. Ushma Teotia,

TGT Science,

PM SHRI Kendriya Vidyalaya No.2 AFS,

Jalahalli East, Bengaluru. (Resource person).

SESSION OVERVIEW

The third technical session of the capacity-building programme focused on "Designing Quality Assessment Tasks" for Class IX Science in alignment with the new NCERT textbook Exploration. The session emphasized the transformation of classroom assessment from traditional recall-based testing to competency-based evaluation that measures conceptual understanding, application of knowledge, analytical thinking, and higher-order cognitive skills.

The resource person, Mrs. Ushma Teotia, conducted the session in an engaging and highly interactive manner through demonstrations, group discussions, collaborative activities, and practical examples. The session enabled participants to understand how assessment can effectively support inquiry-based learning and competency development envisioned in the new curriculum.

Objectives of the Session

By the end of the session, participants were able to:

Design well-structured Multiple-Choice Questions (MCQs) that assess conceptual understanding rather than rote memorization.

Develop competency-based case studies with progressive questioning.

Frame Higher Order Thinking Skills (HOTS) questions using Bloom's Taxonomy.

Prepare balanced question papers using an assessment blueprint with an appropriate distribution of recall, application, and HOTS questions.

Key Highlights

1. The Need for Transforming Assessment

The session began with an activity titled **"The Answer-Key Trap,"** where two questions on the same topic ("Cell") were compared. Participants observed that while one question merely tested recall, the other required students to analyses observations and apply scientific concepts.

The resource person highlighted that:

*Modern science education encourages inquiry, experimentation, and real-life application.

*Assessments must therefore evaluate understanding, reasoning, and problem-solving instead of memorized definitions.

*If classroom teaching becomes competency-based while examinations remain memory-based, students lose interest in inquiry-oriented learning.

Participants compared traditional assessment practices with competency-based assessments and discussed how the latter encourages deeper learning and scientific reasoning.

2. Designing Effective MCQs

The session introduced four essential principles for writing quality MCQs:

a. The stem should clearly communicate the problem independently.
b. Distractors should represent realistic misconceptions rather than obviously incorrect answers.
c. Negative and trick questions should be avoided whenever possible.
d. Each MCQ should assess only one learning objective.

Through the activity **"Distractor Doctor,"** participants analyzed weak MCQs and improved them by replacing unrealistic options, eliminating ambiguity, and making the questions competency-oriented. Examples from chapters on Cells, Forces, Mixtures, Motion, and Atomic Structure illustrated how effective distractors can diagnose students' misconceptions.

3. Developing Case-Based Questions

Participants were introduced to the structure of competency-based case questions.

A good case-based question should contain:

- A short real-life or scientific stimulus.
- A recall-level introductory question.
- An application-based question.
- A HOTS question requiring analysis, prediction, evaluation, or justification.

The resource person demonstrated this using example related to monsoon forecasting, cell division in onion root tips, mixtures, and uniform motion.

Teachers then worked collaboratively in pairs to design complete case-based questions using different scientific contexts, thereby gaining hands-on experience in constructing assessment items aligned with the *Exploration* textbook.

4. Incorporating Higher Order Thinking Skills (HOTS)

Using **Bloom's Taxonomy**, participants explored the progression from lower-order to higher-order thinking.

The six cognitive levels discussed were:

1. Remember
2. Understand
3. Apply
4. Analyze
5. Evaluate
6. Create

The resource person explained how appropriate action verbs such as compare, justify, predict, design, propose, critique, and compose help convert ordinary recall questions into authentic HOTS questions.

An engaging activity titled **"Climb the Ladder"** required groups to transform simple recall questions into higher-order questions by using Bloom's verbs and competency-based thinking.

The session also clarified common misconceptions regarding HOTS, emphasizing that lengthy questions are not necessarily higher-order questions. Genuine HOTS items require students to apply concepts in unfamiliar situations rather than reproduce textbook content.

5. Preparing Balanced Assessment Papers

The concluding academic component focused on preparing balanced assessments through an assessment blueprint.

A suggested distribution for a Class IX Science test paper was presented:

a. 30% MCQs and Recall-based Questions
b. 40% Application and Case-Based Questions
c. 30% HOTS Questions

Participants were encouraged to plan the blueprint before drafting question papers to ensure balanced assessment across different cognitive levels.

The session also discussed common mistakes in assessment design, including:

a. Reusing outdated recall-based questions.
b. Spending insufficient time designing competency-based items.
c. Writing lengthy and complicated case studies.
d. Preparing answer keys without marking criteria.

Practical strategies were suggested to overcome each of these issues.

Reflection Activity

Towards the end of the session, participants engaged in a **Think–Pair–Share** activity, where they reflected on one question from their previous assessments that they would now redesign using the principles learned during the workshop. This reflective exercise encouraged teachers to critically evaluate and improve their own assessment practices.

Major Takeaways

The session concluded with five important messages:

- Assessment should reflect inquiry-based teaching practices.
- Well-designed distractors help identify students' misconceptions.
- Every case-based question should progress from recall to application and finally to higher-order thinking.
- Question length does not determine cognitive level; authentic HOTS questions require reasoning and application.
- Preparing an assessment blueprint before writing a question paper ensures balanced evaluation of all competencies.

Conclusion

The session was highly informative, practical, and relevant to the evolving assessment practices under the new NCERT Exploration curriculum. Through discussions, collaborative activities, and real classroom examples, **Mrs. Ushma Teotia** equipped teachers with practical strategies to design competency-based assessments that effectively evaluate conceptual understanding, scientific reasoning, application, and higher-order thinking skills. The knowledge and techniques gained during this session will significantly support teachers in preparing meaningful classroom assessments that promote deeper learning and align with the objectives of competency-based education.

SESSION -2

DAY -3(22/07/2026).

IMPROVE QUALITY OF ASSESSMENT: MODERATION USING RUBRICS

By – Mrs. Arti Prasad

TGT (Science)
Kendriya Vidyalaya, NAL Campus, Bengaluru Region

ASSOCIATE COURSE DIRECTOR

Session Overview

A highly informative and interactive session on "Improving Quality of Assessment through Moderation Using Rubrics" was conducted by Ms. Arti Prasad, ACD & TGT Science, as part of the ZIET Mysore Capacity Building Programme on 22 July 2026. The session focused on strengthening teachers' understanding of competency-based assessment practices aligned with NEP 2020, NCF 2023, and the new Class IX Science textbook, Exploration.

The resource person emphasized that assessment should move beyond awarding marks and instead become a meaningful process that supports learning, develops

scientific competencies, and provides constructive feedback. The session highlighted the importance of moderation and the effective use of rubrics to ensure fairness, consistency, reliability, and objectivity in classroom assessment.

Objectives of the Session

The session aimed to enable participants to:

Understand the need for improving assessment practices in competency-based education.

Develop and use analytic rubrics for assessing scientific competencies.

Ensure consistency and fairness in assessment through moderation.

Align assessment practices with learning outcomes prescribed in NEP 2020 and NCF 2023.

Provide meaningful feedback that promotes conceptual understanding and scientific thinking.

Session Highlights

1. **Why Assessment Needs to Improve**

The session began by discussing the changing role of assessment in school education. The resource person explained that traditional assessments primarily measure memorization, whereas competency-based education requires assessment of conceptual understanding, scientific inquiry, reasoning, application, and higher-order thinking skills.

Teachers were encouraged to design assessments that:

- Focus on competencies rather than factual recall.
- Evaluate conceptual understanding and scientific practices.
- Promote critical thinking and problem-solving.
- Ensure fairness and consistency across classrooms.
- Provide meaningful feedback that supports continuous learning.

The discussion reinforced that assessment should function as an integral part of the teaching-learning process rather than merely as a tool for assigning marks.

2. Understanding Rubrics

A major component of the session focused on the concept of **rubrics**.

The resource person defined a rubric as a structured scoring guide containing clearly defined assessment criteria and performance levels. Rubrics help teachers evaluate student performance objectively while making expectations transparent to learners.

The essential features of an effective rubric discussed during the session included:

- Clearly defined assessment criteria.
- Multiple performance levels.
- Descriptors explaining expectations at each level.
- Transparency and consistency in scoring.
- Ease of providing constructive feedback.

Participants understood that rubrics not only assist teachers during evaluation but also help students understand what constitutes quality performance.

3. Components of a Science Rubric

The session explored the essential components that should be included while designing rubrics for Science.

The important assessment criteria discussed were:

- Conceptual understanding
- Scientific reasoning
- Investigation and experimentation
- Observation skills
- Data interpretation
- Communication of scientific ideas

Four levels of student performance were introduced:

Level 4 – Exemplary **Level 3 – Proficient**

Level 2 – Developing **Level 1 – Beginning**

The resource person explained how detailed descriptors for each performance level improve reliability and reduce subjectivity during evaluation.

4. Competencies to be Assessed

Participants were guided to assess a broad range of scientific competencies instead of focusing only on written responses.

These competencies included:

- Scientific inquiry
- Observation and experimentation
- Problem-solving abilities
- Investigation skills
- Collaboration and communication
- Application of scientific concepts to real-life situations
- Scientific values and responsible behaviour

The discussion highlighted that competency-based assessment should reflect the holistic development of learners.

5. Sample Rubrics and Practical Demonstration

To provide hands-on understanding, the resource person demonstrated sample analytic rubrics for science investigation activities.

The rubric included criteria such as:

- Observation
- Investigation
- Interpretation
- Communication

Each criterion contained four clearly defined performance levels ranging from excellent performance to beginning level achievement.

Participants discussed how these descriptors enable objective evaluation while ensuring that different teachers assign similar marks for similar student responses.

6. Benefits of Rubrics and Moderation

The session highlighted several advantages of using rubrics together with moderation practices.

These included:

- Greater consistency in evaluation.
- Fair and transparent grading.
- Better quality feedback.

- Improved collaboration among teachers.
- Enhanced reliability of assessment.
- Increased student confidence.
- Promotion of competency-based learning.
- Reflective teaching practices.

The resource person emphasized that moderation strengthens professional dialogue among teachers and ensures that assessment standards remain uniform across classrooms.

7. Assessment of the Chapter "Tissues"

A practical illustration was presented using the Class IX Science chapter **"Tissues."**

The assessment focused on evaluating:

- Conceptual understanding
- Scientific observation
- Classification of tissues
- Application of knowledge in daily life
- Scientific communication

Participants explored various competency-based assessment tasks including:

- Identification of tissues from diagrams.
- Comparison between plant and animal tissues.
- Interpretation of microscope observations.
- Application-based questions using real-life situations.
- Scientific reasoning questions.

A detailed rubric was developed using criteria such as concept accuracy, observation, reasoning, diagram presentation, labelling, and application of knowledge.

8. Assessment Moderation

The resource person explained the importance of moderation in ensuring fairness and consistency.

The moderation process included:

- Using common learning outcomes.
- Applying a common rubric.

- Comparing sample student responses.
- Discussing differences in scoring.
- Arriving at common standards for evaluation.

Participants understood that moderation helps minimise examiner bias and improves the reliability of assessment practices.

9. Generic Analytic Rubric

The session also introduced a generic analytic rubric suitable for most Class IX Science chapters.

Five assessment criteria were suggested:

- Conceptual Understanding
- Scientific Reasoning
- Observation and Interpretation
- Application of Knowledge
- Communication through diagrams and presentation

Each criterion was assessed using four performance levels with corresponding marks, making the rubric flexible enough for competency-based classroom assessments.

10. Sample Student Assessment

To demonstrate practical implementation, the resource person presented a sample student assessment using the rubric.

Marks were awarded criterion-wise, allowing teachers to identify students' strengths as well as areas requiring improvement. Participants observed how rubric-based assessment provides much richer feedback than a single overall score.

Expected Outcomes

The session highlighted that effective moderation and rubric-based assessment would lead to:

- Reliable and objective assessment practices.
- Improved conceptual understanding among students.
- Better quality feedback.
- Development of scientific inquiry and reasoning.
- Enhanced communication skills.
- Promotion of higher-order thinking.

- Greater alignment between classroom teaching and assessment.

Key Takeaways

The major learning points from the session were:

- Assessment should evaluate learning rather than merely assign marks.
- Rubrics make assessment transparent, objective, and consistent.
- Moderation ensures fairness and uniformity in evaluation across teachers.
- Competency-based assessment should align with learning outcomes prescribed in NEP 2020 and NCF 2023.
- Constructive feedback plays a vital role in improving student learning.
- Assessment should encourage inquiry, reasoning, application, and scientific thinking.

Conclusion

The session conducted by **Ms. Arti Prasad, ACD & TGT Science**, was highly enriching and professionally relevant. Through practical examples, sample rubrics, and discussions on moderation practices, participants gained valuable insights into designing fair, reliable, and competency-based assessments. The session reinforced the philosophy that quality assessment is an essential component of quality teaching and meaningful learning. Teachers left the session better equipped to implement rubric-based assessment practices that promote scientific understanding, critical thinking, and continuous improvement in student learning.

SESSION -3

DAY -3(22/07/2026).

UNDERSTAND ASSESSMENT FOR LEARNING: COMPETENCIES, LEARNING EVIDENCE

DEMO TEACHING BY PARTICIPANT TEACHERS

1. **BY: Mr. BORELLI PRASHANTH KUMAR,** TGT SCIENCE

   SCHOOL: PM SHRI KENDRIYA VIDYALAYA KURNOOL

CHAPTER: EARTH AS A SYSTEM: ENERGY, MATTER AND LIFE

Topics Covered: Uneven Heating Causes Wind and Ocean Currents, Biogeochemical Cycles, and Human Impact on Earth's Processes.

Mr. Borelli Prashanth Kumar conducted an engaging and well-structured demonstration class on the topic Earth as a System: Energy, Matter and Life. The session began with a clear introduction to the concept of wind, explaining that wind is the movement of air from regions of high pressure to low pressure. He effectively connected this phenomenon to the uneven heating of the Earth's surface by the Sun, helping students understand how differences in temperature create pressure differences in the atmosphere.

The resource person further explained that land and water absorb and release heat at different rates, leading to the formation of sea breezes and land breezes. He extended this concept to explain the formation of global wind systems and ocean currents, enabling students to relate local weather phenomena to large-scale Earth processes.

To make the learning experience interactive, he demonstrated an activity using a candle, paper spiral, and thread to illustrate the movement of warm air. The activity effectively helped students visualize convection currents and understand how warm air rises due to lower density, creating low-pressure zones.

The session also introduced local wind systems such as valley breezes and mountain breezes, explaining their formation through simple illustrations and real-life examples. The concepts were presented in a logical sequence with the support of diagrams and visual aids, making them easy for students to comprehend.

The presentation concluded with an overview of biogeochemical cycles and the impact of human activities on Earth's natural processes, emphasizing the importance of environmental conservation and sustainable practices.

Overall, the demonstration class was informative, activity-based, and learner-centered. Mr. Borelli Prashanth Kumar effectively integrated scientific concepts with practical demonstrations and real-life examples, ensuring active student participation and enhancing conceptual understanding. The session reflected effective pedagogy, clear communication, and the use of engaging teaching-learning strategies.

2. **BY: Mr. YOGESH TOMAR,** TGT SCIENCE

SCHOOL: KENDRIYA VIDYALAYA RAJAMPET

CHAPTER: PATTERNS IN LIFE: DIVERSITY AND CLASSIFICATION

Topic: *Kingdom Monera to Plant Kingdom (Angiosperms)*

Mr. Yogesh Tomar delivered a well-organized and concept-oriented demonstration class on the topic *Patterns in Life: Diversity and Classification*. The session commenced with a brief introduction highlighting the need for classification of living organisms. Through thought-provoking questions and everyday examples, he encouraged students to appreciate the immense diversity of life on Earth and understand why scientists classify organisms into different groups.

The resource person systematically explained the characteristics of **Kingdom Monera**, emphasizing the unique features of prokaryotic organisms, their simple cellular organization, modes of nutrition, and ecological importance. The explanation was supported with relevant diagrams and visual representations presented through an interactive PowerPoint presentation, enabling students to differentiate between prokaryotic and eukaryotic organisms.

The session gradually progressed to the **Plant Kingdom**, where Mr. Tomar discussed the evolution and classification of plants from simple to more complex forms. He explained the distinguishing features of major plant groups, including **Bryophytes, Pteridophytes, Gymnosperms, and Angiosperms**, highlighting their structural characteristics, methods of reproduction, and evolutionary significance. Real-life examples and comparative illustrations helped students understand the progression of plant evolution in a logical and meaningful manner.

Throughout the session, questioning techniques were effectively used to assess prior knowledge and promote active participation. Students were encouraged to observe, compare, and classify organisms based on their characteristics, thereby developing scientific reasoning and analytical skills. The presentation was enriched with appropriate visuals, diagrams, and classification charts, making abstract concepts easy to understand.

The class concluded with a concise recap of the key concepts and a short interactive discussion to reinforce learning outcomes. The resource person also emphasized the importance of biodiversity and the scientific basis of classification in understanding the living world.

Overall, the demonstration class was informative, learner-centred, and highly engaging. Mr. Yogesh Tomar demonstrated effective pedagogical practices by integrating visual aids, interactive questioning, and concept-based explanations, ensuring meaningful learning and active student participation throughout the session.

3. **BY: Ms. ARATHI NAIR,** TGT SCIENCE

SCHOOL: PM SHRI KENDRIYA VIDYALAYA PATTOM SHIFT 2

CHAPTER: SOUND WAVES: CHARACTERISTICS AND APPLICATIONS

Topic: Properties of Sound Waves

The demo class on "Properties of Sound Waves" was conducted by Ms. Arathi Nair, TGT Science, PM SHRI KV Pattom, Shift II. The session showcased an engaging and activity-based approach to teaching, with emphasis on student participation and conceptual understanding.

The class commenced with an interesting audio-based introduction. The resource person played different types of sounds using her mobile phone and encouraged students to identify and differentiate them. This simple yet effective activity immediately captured the students' attention and activated their prior knowledge, creating curiosity about the topic.

Following the introduction, the discussion was smoothly connected to the concept of sound waves and their properties. The session remained highly interactive, with students actively responding to questions and sharing their observations.

To strengthen conceptual understanding, the resource person effectively integrated Live Worksheets, enabling students to identify and understand the parts of a sound wave through an engaging digital activity. The use of interactive technology enhanced student participation and provided immediate reinforcement of key concepts.

A hands-on demonstration was also conducted using small pieces of paper to illustrate the propagation of sound waves. This simple classroom activity enabled students to visualize how vibrations travel through a medium, making the abstract concept more concrete and easier to understand. The demonstration encouraged observation, discussion, and inquiry among the students.

Overall, the session was well-structured, learner-centred, and effectively blended technology with hands-on activities. The resource person successfully maintained student engagement throughout the class and demonstrated innovative pedagogical strategies that promoted active learning, conceptual clarity, and meaningful classroom interaction

SESSION -1

DAY -4 (23/07/2026).

USING DIGITAL RESOURCES EFFECTIVELY: QR CODES, SIMULATIONS, VIRTUAL LABS & AI

BY - Mrs. Ushma Teotia,
TGT Science,
PM SHRI Kendriya Vidyalaya No.2 AFS,
Jalahalli East, Bengaluru. (Resource person).

Session Overview

The session conducted by **Mrs. Ushma Teotia** focused on the effective integration of digital resources into science teaching as envisioned in the new **NCERT Class IX Science textbook – Exploration**. Through an engaging blend of demonstrations, discussions, and collaborative activities, the resource person illustrated how digital tools such as **QR codes, virtual laboratories, interactive simulations, and Artificial Intelligence (AI)** can significantly enrich classroom teaching and enhance students' conceptual understanding. The session emphasized that technology should support inquiry, observation, experimentation, and critical thinking rather than replace meaningful classroom interactions. Participants also explored practical strategies for teaching in classrooms with limited digital infrastructure, ensuring that quality science education remains accessible to all learners.

Key Highlights of the Session

1. Digital Resources Embedded in the New Textbook

The resource person introduced participants to the built-in digital features of the *Exploration* textbook, explaining that digital learning is no longer an optional addition but an integral component of the curriculum. Participants learnt about:

- QR codes integrated into every chapter
- "What If?" boxes promoting creative and ethical thinking
- "Next Level Up" sections encouraging advanced learning
- "At a Glance" summaries for quick revision

These features enable students to explore scientific concepts independently beyond the printed text while supporting self-directed learning.

2. Effective Use of QR Codes

An interactive activity allowed participants to scan QR codes and explore digital simulations. The session highlighted that teachers should always preview QR-linked resources before classroom use and carefully integrate them into lesson planning. It was demonstrated that even a single shared device or projector can effectively facilitate digital learning for the entire class.

3. Simulations and Virtual Laboratories

The resource person explained how simulations and virtual laboratories make abstract and invisible scientific concepts easier to understand. Participants explored several freely available educational platforms, including:

- PhET Interactive Simulations
- OLabs
- Sketchfab 3D Models
- NASA Eyes
- MolView

The session emphasized that virtual experiments provide safe, repeatable, and accessible learning experiences while enabling students to visualize phenomena that cannot be easily observed in conventional laboratories.

4. Teaching Without Internet Connectivity

Recognizing the challenges faced by many schools, the resource person demonstrated that effective science teaching does not depend solely on technology. Participants designed **analog simulations** using role-play and simple classroom materials to explain scientific concepts. An engaging example illustrated particle arrangements in solids, liquids, and gases by having participants themselves act as particles. This activity reinforced that conceptual understanding can be achieved even in technology-limited classrooms through creativity and active participation.

5. Responsible Use of Artificial Intelligence

The session introduced AI as a valuable planning assistant for teachers rather than a replacement for professional judgement. Participants learnt how AI can support:

- Preparing competency-based questions
- Designing HOTS and case-based assessments
- Developing lesson plans
- Creating rubrics
- Generating alternative explanations and analogies

Mrs. Ushma Teotia also emphasized three essential principles for responsible AI use:

- Always verify AI-generated content before classroom use.
- Never allow AI to replace students' own thinking and creativity.
- Protect students' personal information and maintain data privacy.

6. Practical Classroom Strategies

Through a worked example on **Sound Waves**, the session demonstrated how a traditional lesson can be transformed using digital resources by integrating videos, simulations, analog activities, and AI-generated assessment tasks. The resource person also discussed practical solutions for common classroom constraints such as limited devices, poor internet connectivity, and concerns regarding screen time, encouraging teachers to adopt flexible and low-cost alternatives whenever required.

Major Takeaways

- Digital resources are an integral part of the new *Exploration* textbook and should be thoughtfully incorporated into lesson planning.
- QR codes, simulations, and virtual laboratories enhance inquiry-based, experiential, and competency-based learning.
- Effective digital teaching is possible even with minimal technological infrastructure.
- Offline analog simulations can successfully replicate the thinking processes promoted by digital tools.

- AI can assist teachers in lesson planning, assessment design, and content development when used responsibly and ethically.
- Teachers should always verify digital content before using it in classrooms.
- Technology should complement—not replace—effective pedagogy, observation, experimentation, and student engagement.

Conclusion

The session by **Mrs. Ushma Teotia** provided participants with practical insights into integrating digital technologies meaningfully within science education. Through interactive demonstrations, collaborative activities, and discussions, the resource person showcased how QR codes, virtual laboratories, simulations, analog models, and AI tools can enrich classroom instruction while promoting inquiry, conceptual understanding, and scientific thinking. The session reinforced that successful technology integration depends not on the availability of sophisticated devices but on thoughtful pedagogical planning and effective classroom implementation. Participants left the session equipped with practical strategies to confidently use both digital and offline resources, creating engaging, inclusive, and learner-centered science classrooms aligned with the vision of **NEP 2020** and

NCF-SE 2023.

SESSION -2

DAY -4 (23/07/2026).

PLAN FOR DIVERSE LEARNERS: UNIVERSAL DESIGN FOR LEARNING, MULTILINGUALISM.

BY - Mrs. Renu Dubey

TGT Science,

PM Shri KV Bolarum, Hyderabad Region

Session Overview

The session focused on planning for diverse learners in the context of the new NCERT Class IX Science textbook (2026–27). It highlighted how the textbook has been designed in alignment with NEP 2020 and NCF-SE 2023 to ensure equitable, inclusive, and competency-based learning for all students. The session emphasized the implementation of Universal Design for Learning (UDL) and multilingual pedagogy to address the varied learning needs, abilities, languages, and socio-cultural backgrounds of students. Teachers were encouraged to adopt flexible, learner-centered instructional practices that promote active participation, accessibility, and meaningful learning experiences.

Key Highlights

•Emphasize the importance of recognizing learner diversity and creating inclusive science classrooms where every student feels valued.

•Explained the three core principles of Universal Design for Learning (UDL)—Multiple Means of Engagement, Representation, and Action & Expression—to ensure accessibility and participation for all learners.

•Showcased how the new NCERT Science textbook promotes inquiry-based and competency-based learning through activities, experiments, projects, case studies, reflection questions, and real-life contexts.

•Highlighted the use of visual aids, multilingual resources, digital tools, and collaborative learning strategies to accommodate different learning styles and language backgrounds.

•Discussed multilingual classrooms and translanguaging as effective approaches to improve conceptual understanding while respecting students' home languages.

•Demonstrated classroom examples and activities that enable students to express learning through experiments, presentations, models, drawings, and multilingual reports.

•Reinforced the teacher's role in designing flexible, inclusive learning environments that provide equal opportunities for every learner to succeed.

Conclusion

The session reinforced that the new NCERT Class IX Science curriculum moves beyond a one-size-fits-all approach by embracing diversity through inclusive pedagogy, Universal Design for Learning, and multilingual practices. It encouraged teachers to create accessible, engaging, and learner-centered classrooms where every student, irrespective of background, language, or ability, can actively participate, develop scientific competencies, and achieve meaningful learning outcomes

SESSION -3

DAY -4 (23/07/2026)

PREPARE CLASSROOM READY RESOURCES: LESSON PLANNING (COLLABORATIVE LESSON PLANNING FINALIZE LESSONS TEACHING RESOURCES)

The hands-on group activities provided participants with an opportunity to collaboratively demonstrate competency-based and experiential teaching practices through innovative classroom presentations. Each group showcased learner-centred instructional strategies, integrating simple teaching-learning materials (TLMs), inquiry-based learning, and interactive activities to enhance conceptual understanding. The presentations reflected the effective implementation of the principles envisioned in the new Science curriculum and encouraged collaborative learning, creativity, and reflective teaching practices.

Topics Covered:

1.Pollination in Plants

2.Rutherford's Atomic Model

3.Compression and Rarefaction in Waves

Key Highlights:

•Collaborative planning and presentation of competency-based learning activities.

•Integration of activity-based, inquiry-driven, and experiential teaching approaches.

•Effective use of low-cost teaching-learning materials (TLMs) to simplify scientific concepts.

•Demonstration of innovative classroom practices to enhance learner engagement.

•Promotion of teamwork, reflective practice, and the exchange of effective teaching strategies.

SESSION -1

DAY 5 (24/07/2026)

The first session of the day was conducted by Mr. Dinesh Kumar, Course Director, and was highly engaging, interactive, and thought-provoking.

He began the session with a fascinating demonstration using ethyl alcohol and potassium permanganate ($KMnO_4$) to create a fountain effect. After the activity, he explained the scientific principle behind the phenomenon in detail, emphasizing how pressure difference leads to the observed effect. The demonstration effectively connected theory with practical observation and generated great interest among the participants.

He then discussed the concepts of persistence of vision and persistence of hearing, explaining their significance in our daily lives and how these phenomena influence the way we perceive visual and auditory information.

The session also included a discussion on the five different domains of learning, highlighting their importance in holistic education and the overall development of students.

Towards the end, Mr. Dinesh Kumar explained the three happy hormones—dopamine, serotonin, and endorphins—and discussed their roles in regulating mood, motivation, emotional well-being, and learning. He also elaborated on how positive classroom experiences and a supportive learning environment can

stimulate these hormones, thereby enhancing student engagement and effective learning.

Overall, the session was highly informative, activity-oriented, and enriched with practical examples, making the learning experience both enjoyable and meaningful.

Demonstration Classes on Atomic Foundation of Matter

Three demonstration classes based on the lesson plan for "Atomic Foundation of Matter" were conducted by **Ms.Subhadra Sankar, Ms.C. Resishmi, and Ms.Swapna Sudhakaran**. The classes were well planned, activity-oriented, and highly engaging, with a strong focus on learner participation and conceptual understanding.

Ms.Subhadra Sankar demonstrated the concepts related to the Law of Conservation of Mass, Law of Constant Proportions, and Dalton's Atomic Theory through interactive activities and guided discussions. Participants actively participated in observations, analysis, and reasoning, helping them develop a clear understanding of the fundamental laws of chemical combination.

Ms.C. Resishmi handled the topic Covalent and Ionic Bond Formation. The session included engaging activities and visual representations that enabled students to understand the process of bond formation by electron sharing and electron transfer. The class encouraged collaborative learning and strengthened conceptual clarity through active participation.

Ms.Swapna Sudhakaran demonstrated the topic Properties of Covalent and Ionic Compounds. The class was conducted through activity-based learning, discussions, and real-life examples that helped students compare the physical and chemical properties of ionic and covalent compounds. Students were actively involved throughout the session, making the learning process meaningful and enjoyable.

Overall, all three demonstration classes effectively showcased activity-based pedagogy, competency-based teaching practices, and learner-centred instructional strategies. The sessions promoted scientific temper, critical thinking, collaboration, and deeper conceptual understanding among the participants.

SESSION -2

DAY 5 (24/07/2026)

Demonstration classes on the chapter "Describing Motion Around Us" were conducted by **Ms.Shikha Kumari and Dr. Mathew Chako**. The lesson plan covered the major concepts of motion in a straight line, distance and displacement, speed and velocity, acceleration, position-time and velocity-time graphs, equations of motion, numerical problem-solving, and uniform circular motion.

Both demonstration classes were highly interactive, activity-based, and learner-centred. The resource persons effectively integrated real-life situations, hands-on demonstrations, collaborative learning, graphical analysis, and numerical problem-solving to develop conceptual understanding among students.

The sessions included engaging activities such as analysing the motion of toy cars, interpreting position-time and velocity-time graphs, deriving equations of motion graphically, solving competency-based numerical problems, and demonstrating uniform circular motion using a stone tied to a string. Students actively participated in discussions, observations, calculations, and group tasks, making the learning process meaningful and enjoyable.

Special emphasis was given to connecting classroom learning with real-life applications such as vehicle speed, braking distance, GPS navigation, satellite motion, and road safety. The pedagogical strategies promoted inquiry, critical thinking, problem-solving, data interpretation, and scientific temper.

Overall, the demonstration classes showcased effective implementation of competency-based pedagogy through activity-oriented teaching, integration of mathematics and science, continuous assessment, and active learner engagement, providing valuable insights into teaching the chapter in an interactive and experiential manner.

Demonstration Classes on Journey Inside the Atom

Demonstration classes on the chapter "Journey Inside the Atom" were conducted by **C. V. Prasanna and Noble V. Sebastian.** The sessions covered the key concepts of discovery of subatomic particles, atomic models, and atomic number, mass number, valency, isotopes, and isobars through well-structured, competency-based pedagogical strategies.

Both resource persons adopted an activity-oriented and learner-centred approach, making the classes highly interactive and engaging. The sessions incorporated storytelling on the discoveries of scientists such as J. J. Thomson, Rutherford, Goldstein, Chadwick, and Bohr, followed by role plays, model-making activities,

concept mapping, and inquiry-based discussions to strengthen conceptual understanding.

Participants actively participated in constructing atomic models using simple materials, comparing different models, solving problems related to atomic number and mass number, and classifying isotopes and isobars through collaborative activities. Digital resources such as PhET simulations, animations, and multimedia presentations were effectively integrated to help learners visualize atomic structure and the evolution of atomic theory.
The demonstrations successfully connected classroom concepts with real-life applications, including the use of isotopes in medicine, archaeology, agriculture, nuclear energy, and industry, as well as the role of atomic structure in modern technology such as semiconductors, lasers, mobile phones, and medical imaging.
The demonstration classes reflected effective implementation of competency-based education through experiential learning, collaborative activities, continuous assessment, and integration of science with mathematics, history, English, and ICT. The sessions fostered scientific temper, critical thinking, creativity, communication, and evidence-based reasoning among learners.

Demonstration Class on the topic : Earth as a system

Chitra Lekha Sharma conducted an engaging demonstration class on Concept 1: Earth as a System – Earth's Spheres, Solar Radiation and Uneven Heating from the chapter "Earth as a System: Energy, Matter and Life."
The session began with an interactive brainstorming activity to assess students' prior knowledge about the Earth and its components. Through thought-provoking questions and a Think–Pair–Share strategy, students actively discussed the interconnected nature of the Earth's systems. Using a globe and torch demonstration, the resource person effectively explained how the Earth's shape, latitude, and albedo result in the unequal distribution of solar radiation, leading to uneven heating of the Earth's surface.
The five major spheres of the Earth—geosphere, hydrosphere, atmosphere, cryosphere, and biosphere—were explained with the help of diagrams, multimedia presentations, and inquiry-based discussions. Students were encouraged to analyse the interactions among these spheres and relate them to real-life phenomena such as climate, seasons, weather patterns, and the use of solar energy.
The class was highly interactive, with continuous questioning, collaborative discussions, and observation-based activities that promoted critical thinking and conceptual understanding. Effective integration of geography, mathematics, and

environmental studies enriched the learning experience and helped students appreciate the Earth as an interconnected system.
The demonstration showcased competency-based, activity-oriented pedagogy, encouraging scientific inquiry, environmental awareness, collaboration, and active learner participation throughout the session.

Session on Advanced Science by Mr. Dinesh Kumar

An enriching session on Advanced Science was conducted by Mr. Dinesh Kumar, Course Director. The session was highly interactive and activity-oriented, with a strong emphasis on developing scientific thinking through simple yet effective demonstrations.
The resource person used a variety of engaging activities to explain fundamental scientific concepts in an interesting manner. Each activity was followed by meaningful discussions that encouraged participants to observe, analyse, predict, and infer scientific principles. The session promoted inquiry-based learning and demonstrated how everyday materials and simple experiments can be used to teach complex scientific concepts effectively.
Through continuous interaction and questioning, participants were actively involved throughout the session. The resource person highlighted the importance of observation, curiosity, experimentation, and logical reasoning in science education. Practical classroom strategies and innovative teaching techniques were shared to make science learning more engaging and experiential for students.
The session was highly informative, inspiring, and enjoyable. It provided valuable insights into activity-based pedagogy and reinforced the significance of hands-on learning in fostering scientific temper, critical thinking, creativity, and problem-solving skills among learners.

Feedback Speech

Name: Yogesh Tomar (TGT Biology)
Kendriya Vidyalaya: Kendriya Vidyalaya Rajampet

It is my privilege to share our feedback on behalf of all the participants regarding the New NCERT Class IX Science Textbook Orientation Programme. The past few days have been truly enriching and have given us a fresh perspective on science teaching. The sessions were practical, interactive, and closely aligned with the vision of the new curriculum.
We learned how the **inquiry-based learning**, **competency-based assessment**, **Experiential Learning** and **the effective use of simple teaching-learning materials** can make science more engaging and meaningful for students. The resource persons shared innovative classroom practices that I am excited to implement in my own classroom.

We would also like to express my sincere gratitude to our **Course Coordinator, Mr. Dinesh Kumar Sir**, whose energetic guidance and motivating sessions made this programme both enjoyable and inspiring.
We sincerely thank ZIET Mysuru, all the resource persons, participants and the organizing team for this wonderful learning experience. We will be returning with new ideas, greater confidence, and renewed enthusiasm to implement the new textbook effectively.

Thank you.

PHOTO GALLERY


KENDRIYA VIDYALAYA SANGATHAN
ZONAL INSTITUTE OF EDUCATION & TRAINING (ZIET), MYSURU
Empowering Master Trainers for
Effective Implementation of the New Science Curriculum
TE COURSE DIRECTOR
Arti Prasa
TGT (Science)
KV NAL
TISSUE IN ACTION
Every Tissue - Every Function - Every Moment


KENDRIYA VIDYALAYA SANGATHAN
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TISSUE IN ACTION
Every Tissue - Every Function - Every Moment


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DRIVE LINKS :

Lesson Plan Chapter wise :
https://drive.google.com/drive/folders/1IjIU5Nyf4qjH95HkSr8mtsoa-HG05qt-

CBQ ASSESSMENT:
https://drive.google.com/file/d/1QOkMjoBe3EkRAtH_eYuZZ3wt0_TbTMhV/view