

Report on Experimental Learning Activity to Science Museum, Radio Telescope, Botanical Garden and Doddabetta Peak at Coimbatore & Ooty

Date of Visit: 19 & 20 February 2026

Number of Students: 09

Organized by: UG Department of Physics

Place: Coimbatore & Ooty

Objectives:

The objective of the educational visit to Experimenta Science Centre, Ooty Radio Telescope, Government Botanical Garden and Doddabetta Peak was to enhance students understanding of scientific principles through direct observation and experiential learning.

The visit aimed to:

- Connect theoretical knowledge with practical applications.
- Develop scientific thinking, observation, and analytical skills.
- Understand real-world applications of physics, astronomy, and biological sciences.
- Promote curiosity, research interest, and environmental awareness.

1. Experimenta Science Centre

About Experiments Science Centre

The **Experimenta Science Centre, Coimbatore**, is an interactive science museum designed to promote experiential and activity-based learning. The Centre provides a platform where students can explore scientific principles through hands-on experiments and working models rather than only theoretical study.

It features a wide range of interactive exhibits covering subjects such as Physics, Mathematics, Mechanics, Optics, Electricity, and Magnetism. The Centre encourages students to touch, operate, and experiment with models to understand fundamental laws and concepts in a practical manner.

Live demonstrations and guided sessions conducted by instructors help students clearly understand scientific phenomena and their real-life applications. The Centre aims to develop curiosity, creativity, critical thinking, and problem-solving skills among learners.

Overall, Experimenta Science Centre serves as an effective learning environment that bridges the gap between classroom theory and practical understanding of science.

Activities & Highlights

- **Laws of Motion Experiments:** Students performed experiments demonstrating Newton's Laws of Motion using inclined planes and moving objects. They understood the relationship between force, mass, and acceleration, and observed how friction affects motion.
- **Optics Experiments:** Through experiments with mirrors, lenses, and light boxes, students studied reflection and refraction of light. They learned how images are formed and understood practical applications such as microscopes and optical instruments.

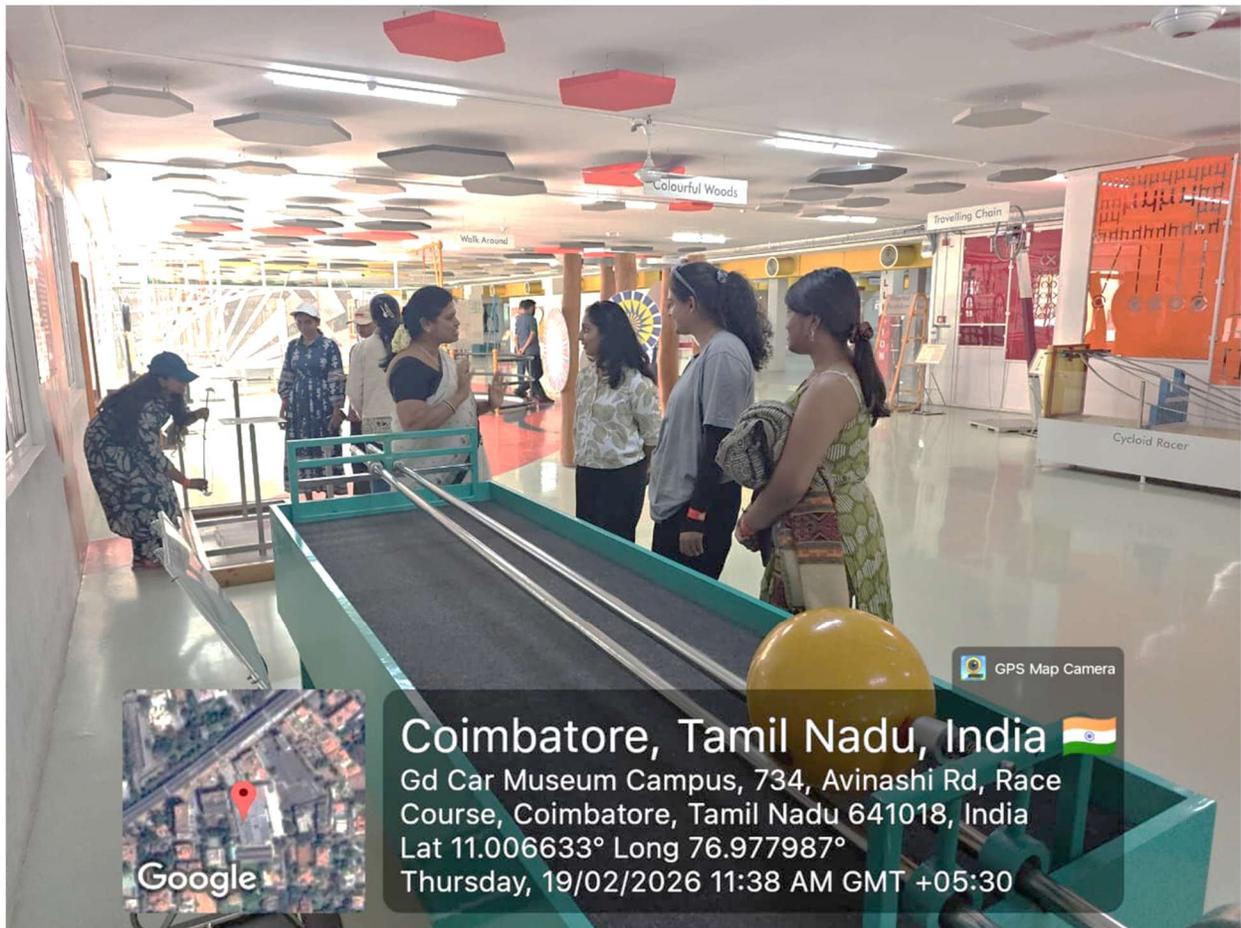


Photo 1: Students involved in Experimenta Science Centre.



Photo 2: Student and Teachers at Experimenta Science Centre.

- Electricity & Magnetism Experiments: Students worked with simple circuits to understand Ohm's Law, series and parallel connections, and magnetic field patterns. They learned the relationship between voltage, current, and resistance through practical verification.
- Pressure and Bernoulli's Principal Demonstrations: By observing airflow and pressure-based models, students understand how pressure varies with velocity and its application in aerodynamics and daily-life phenomena.
- Centre of Gravity & Balance Activities: Experiments involving balancing objects helped students understand equilibrium, stability, and the concept of center of mass.
- Puzzle & Logical Thinking Activities: Interactive problem-solving setups enhanced analytical thinking and improved reasoning skills.
- Wave and Sound Experiments: Students observed vibration and resonance models to understand sound production and wave behavior.

Through these hands-on experiments, students gained a deeper understanding of theoretical concepts, improved observation skills, and strengthened the connection between classroom learning and real-world applications.

Learning Outcomes

- Understood scientific concepts through practical experimentation rather than theory.
- Improved observation and analytical skills by performing experiments.
- Connected classroom topics with real-life applications.
- Developed scientific curiosity and critical thinking.
- Learned the importance of experimentation in scientific discovery.
- Enhanced teamwork and collaborative learning through group participation

2. Radio Telescope

About Radio Telescope

The **Ooty Radio Telescope (ORT)** is one of India's important radio astronomy instruments. It is located in the hills of Ooty (Udhagamandalam), Tamil Nadu, at an altitude of about 2200 meters.

- It is a large cylindrical parabolic radio telescope.
- Length: about 530 meters
- Width: about 30 meters
- Operates at a frequency of 326.5 MHz
- Established in 1970.
- It is operated by the National Centre for Radio Astrophysics, which is part of the Tata Institute of Fundamental Research

Activities & Highlights

- During our visit to the Radio Telescope with 9 students, we actively participated in various learning activities and observed several important demonstrations.

- Observed the structure and working of the large parabolic dish antenna used to collect radio waves from space.
- Understood how radio signals from celestial bodies like the Sun are received and converted into electrical signals.
- Attended a live demonstration on how signals are amplified and processed using receivers and computer systems.
- Learned about tracking techniques used to follow the movement of astronomical objects across the sky.
- Interacted with experts and asked questions regarding radio astronomy and space research.
- Observed how noise and interference from Earth are minimized while detecting weak cosmic signals.
- Seeing the massive radio dish antenna and understanding its scientific importance was the most exciting part of the visit.
- The live signal detection demonstration gave us practical exposure to how real-time space data is collected.
- Learning about discoveries such as pulsars and distant galaxies through radio waves made the session more interesting.
- The interactive explanation helped us connect theoretical knowledge of electromagnetic waves with real-life applications.

Overall, the visit was informative, engaging, and enhanced our understanding of radio astronomy and its role in space science.



Photo 3: Student and Teachers at Radio Telescope.



Photo 4: Student and Teachers at Radio Telescope.

Learning Outcomes

After visiting the Ooty Radio Telescope, the students were able to:

- Understand the working principle of a radio telescope and how it detects radio waves from celestial objects.
- Differentiate between optical and radio telescopes and learn why radio astronomy is important in space research.
- Connect electromagnetic wave theory with practical application, especially the use of radio frequencies in astronomy.
- Gain knowledge about pulsars, galaxies, and interstellar mediums, which are studied using radio signals.
- Learn how Earth's rotation helps in tracking celestial objects, as the telescope is designed based on the hill slope alignment.
- Develop awareness about Indian contributions to space science and research.
- Improve scientific curiosity and observational skills through real-time exposure to astronomical instruments.

3. Botanical Garden

About Botanical Garden

The **Government Botanical Garden, Ooty**, is one of the most famous and well-maintained botanical gardens in India. It is located in the Nilgiris Hills of Tamil Nadu and was established in 1848. The garden is spread over about 55 acres and is maintained by the Tamil Nadu Horticulture Department.

- Wide variety of rare and exotic plants.
- Beautifully maintained lawns and flower beds.
- Medicinal and ornamental plants.
- Fern house and conservatory.
- A 20-million-year-old fossil tree trunk.
- Annual Flower Show conducted during summer.

Activities & Highlights

- Wide Variety of Plant Species – Rare, exotic, ornamental, and indigenous plants of the Nilgiris region.
- Fossil Tree Trunk – A 20-million-year-old fossil that attracts major attention.
- Terraced Lawns – Beautifully arranged garden sections spread across 55 acres.
- Medicinal Plant Section – Plants used in traditional and modern medicine.
- Fern House – Collection of different fern species.
- Annual Flower Show – Colorful seasonal flower exhibition held during summer.
- Glass House – Displays seasonal flowers and special plant varieties.



Photo 5: Student and Teachers at Botanical Garden.

Learning Outcomes

- After visiting the Government Botanical Garden, the students were able to:
- Understand plant diversity by observing different species of trees, shrubs, herbs, and flowering plants.
- Learn about plant classification based on characteristics such as structure, habitat, and uses. Gain knowledge about medicinal plants and their importance in traditional and modern medicine.
- Develop awareness about biodiversity conservation and the need to protect endangered plant species.
- Understand the ecological importance of plants in maintaining environmental balance.
- Improve observation and identification skills through direct interaction with various plant species.
- Enhance environmental responsibility and appreciation for nature.

4. Doddabetta Peak

About Doddabetta Peak

Doddabetta Peak, situated in the Nilgiri Hills of Tamil Nadu, stands at an elevation of approximately 2,637 m above mean sea level, making it the highest peak in the range. Geologically, it forms part of the Southern Granulite Terrain, dominated by charnockite rocks of Precambrian age. The region exhibits montane (shola–grassland) ecosystems, high biodiversity, and significant orographic rainfall influence, contributing to its unique microclimatic conditions.

- Highest peak in the Nilgiri Hills at 2,637 m (8,652 ft) above mean sea level.
- Located about 9 km from Ooty in Tamil Nadu.
- Part of the Southern Granulite Terrain, composed mainly of Precambrian charnockite rocks.
- Characterized by montane shola–grassland ecosystems with rich biodiversity.
- Experiences orographic rainfall and cool, temperate climatic conditions.
- Offers panoramic views of the Nilgiri plateau; features a telescope house for observation.
- Ecologically significant for watershed functions and regional hydrological balance.

Activities & Highlights

- The objective of visiting Doddabetta Peak was to study the geographical features, climatic conditions, and ecological characteristics of a high-altitude region through direct observation and scientific analysis.
- Scientific Aspects Observed
- Understanding altitude (2,637 m above sea level) and its influence on temperature (environmental lapse rate).
- Observation of mountain topography and landscape formation in the Nilgiri Hills.
- Study of shola forest ecosystem and plant adaptations to cold climatic conditions.
- Awareness of environmental conservation and the role of mountains in the water cycle.
- Observation through the public telescope to understand principles of refraction, convex lenses, and optical magnification.

- Overall, the visit provided practical exposure to concepts of geography, climatology, environmental science, and basic optics in a natural high-altitude environment.



Photo 6: Student and Teachers at Doddabetta Peak

Learning Outcomes

- Explain its geological formation within the Southern Granulite Terrain and identify dominant rock types such as charnockite.
- Analyze the influence of altitude on climate and orographic rainfall patterns.
- Describe the shola–grassland ecosystem and its ecological significance.
- Evaluate the peak’s role in regional hydrology and biodiversity conservation.
- Correlate topographical features with microclimatic variations in montane environments.

Conclusion

The two-day educational visit to Experimenta Science Centre, Ooty Radio Telescope, Government Botanical Garden, and Doddabetta Peak provided valuable experiential learning to the students. It effectively bridged classroom theory with real-world scientific applications in physics, astronomy, environmental science, and biodiversity. The visit enhanced scientific curiosity, observational skills, teamwork, and environmental awareness, making it a meaningful and enriching academic experience for all participants.
