

One-Day Workshop on "Explore the Different Spheres of the Earth"

Organized by the Department of Geography, Raidighi College, in collaboration with the Birla Industrial & Technological Museum (BITM), featuring **Dr Tarun Kumar Das** as the resource person.

1. Introduction & Context

On 20-06-2025, the Department of Geography at Raidighi College, South 24 Parganas—supported by the esteemed Birla Industrial & Technological Museum (a National Council of Science Museums unit under the Ministry of Culture)—will host a **One-Day Workshop** titled **"Explore the Different Spheres of the Earth."** Dr Tarun Kumar Das, a noted geoscientist, will guide participants through an interactive journey of Earth's dynamic subsystems: geosphere, hydrosphere, atmosphere, biosphere, and the pedosphere and cryosphere as advanced extensions.

This event aims to bridge theoretical knowledge and experiential learning for students, faculty, and geography enthusiasts.

2. Workshop Objectives

1. **Understand the core characteristics of Earth's primary spheres:**
 - o **Lithosphere/Geosphere:** Earth's solid rock layer—crust and upper mantle—whereby mountains, tectonics, and soil formation occur.
 - o **Hydrosphere:** All forms of water—oceans, rivers, lakes, groundwater, ice—and their roles in climate and life.
 - o **Atmosphere:** The gaseous envelope that includes multiple layers and regulates weather, climate, and air pressure.
 - o **Biosphere:** The realm of life, including interactions like photosynthesis, nutrient cycles, and ecological feedbacks. **Pedosphere (Soil sphere):** The thin layer of soil formed through lithosphere–atmosphere–biosphere–hydrosphere interactions
2. **Explore the interactions and feedbacks** such as erosion, water cycle dynamics, and energy exchange.
3. **Highlight human impacts**—from pollution and land-use changes to conservation and sustainability initiatives.
4. **Equip participants with practical, inquiry-based methodologies**, like local site investigations and image-based analysis, to apply systems thinking.

3. Workshop Structure

Session 1 – Foundations (Morning)

- **Welcome Address & Contextual Overview**
The Head of Geography and a BITM representative will introduce the historical and

institutional background. BITM's legacy spans from its conception under CSIR to its modern role in science education and public engagement.

- **Interactive Lecture: Introducing the Four (Five) Spheres**

Dr Das will define each sphere:

- o **Geosphere (Lithosphere)** – rock, tectonics, mineral resources.
- o **Hydrosphere** – water distribution, role in climate. **Atmosphere** – structure, pressure, weather systems.
- o **Biosphere** – life processes and ecological networks. **Pedosphere** – soil interactions, its mediator role.

- **Group Activity: “Sphere Mapping”**

Using maps or images of coastal zones and deltaic plains (e.g., Sunderbans), students identify expressions of multiple spheres—river erosion, delta soils, vegetation, and local climate dynamics.

Session 2 – Dynamic Interactions (Midday)

- **Hands-On Demonstration: Erosion & Weathering**

Replicating the sandblaster and dry-ice experiments from Generation Genius, Dr Das illustrates how atmospheric forces erode rock (geosphere) and influence microclimates (atmosphere/hydrosphere)

- **Climate Influence of Water**

A tank experiment will showcase how warm/cold water influences air temperature above it, simulating ocean-atmosphere thermal feedback

- **Earth System Science Overview**

Dr Das explains the ESS framework, which integrates all spheres—including cryosphere and magnetosphere—and emphasizes fluxes of energy/matter.

Session 3 – Field Application & Analysis (Afternoon)

- **Micro-Field Study at College Grounds**

Participants collect soil samples, measure microclimate conditions (temperature/humidity), and observe plant and water interactions, linking back to sphere theory.

- **Data Analysis & Reflective Discussion**

Groups interpret their findings, discussing interdependence—e.g., how soil moisture affects vegetation, or plant cover moderates local temperature.

Session 4 – Human Impacts & Sustainability

- **Case Studies: Anthropogenic Effects**

Detailed discussion on:

- o Air pollution altering atmospheric chemistry and hydrological cycles.
- o Deforestation's effects on biosphere–pedosphere–hydrosphere interactions.
- o Soil contamination and river pollution from mining/waste.

- **Conservation & Solutions**

Examples including recycling (energy/material savings across spheres), reforestation, and wetland restoration are examined.

Closing Session & Wrap-Up

- **Expert Q&A with Dr Das**
Participants can explore specialized topics in geology, climatology, environmental conservation, or career pathways in Earth sciences.
- **Reflective Exercise**
A guided recap using a “concept map” linking spheres with observed phenomena and interventions.
- **Certificates & Networking**
Each attendee receives a participation certificate; informal interactions follow.

4. Educational Significance & Rationale

1. **Multi-sphere literacy:** Beyond individual learning, students develop systems thinking—recognizing Earth as an interrelated whole.
2. **Inquiry-based learning:** Hands-on activities and local examples make science relevant and engaging.
3. **Alignment with national educational goals:** Supports curricular aims in geography, environmental science, and experiential learning.
4. **Institutional synergy:** The partnership leverages BITM’s expertise (such as "Science on a Sphere," planetarium shows, and live demonstrations) to enrich pedagogical delivery

5. Additional Resources

- **Generation Genius Earth Spheres video** – dynamic visual explanations
- **NASA’s “Spheres of Earth” activity guide** – ideal for classroom replication
- **EarthLabs “Think Globally, Act Locally” module** – supports field-based learning. Participants will receive digital handouts (lecture slides, worksheets, reflective exercises) to extend learning post-workshop.

6. Logistics & Invitation

- **Date & Time:** , 9 AM–5 PM
- **Venue:** Raidighi College main auditorium (audio-visual enabled, seating ~210) and adjacent open spaces
- **Target Audience:** Undergraduate geography students, science teachers, and local high-school learners.
- **Registration:** Free, via the college portal or BITM outreach.
- **What to Bring:** Notebooks, pens, smartphone cameras, and weather-appropriate attire.

We warmly invite students, educators, and all those fascinated by Earth’s dynamic systems to participate. Come explore how the spheres shape our planet—and our future—under expert guidance in both theory and practice.

