EMPOWERING FUTURE SCIENTISTS

Inquiry-Based Learning & The GLOBE Program in Basic Education

Project: Meninas no Espaço
Location: E.E. Prof. Maria das Graças Silva Germano | Jucurutu, RN
Mission Date: 2025

THE MISSION: SCIENTIFIC LITERACY

INQUIRY

Moving **beyond theory** to **hands-on investigation.** Developing skills in observation and argumentation.

SCOPE

Targeting **5th to 9th Grade.** Implementing 5 distinct GLOBE Program protocols.

ENGAGEMENT

Citizen Science goal. Students produce valid data via narratives, diagrams, and records.

OBJECTIVE: Building skills for a sustainable future.

MISSION CONTROL & CONTEXT

THE BASE: Jucurutu, RN

- Rural Community Context
- Top-ranked IDEB score in the municipality
- Transforming limited resources into opportunities

THE SQUAD

COMMANDER:
Prof. João Feliciano (Physics)

STUDENT TEAM:

- Ana (Team Leader)
- Isabely (Theory Ops)
- Fernanda (Digital Design)
- Maria (Practical Ops)

STRATEGY: Peer-to-Peer Mentorship

PROTOCOL 01: ATMOSPHERE

Climate & Latitude

- **TARGET:** 6th Grade (28 Students)
- **INQUIRY:** How does latitude influence temperature?
- **OPERATION:**
  - Analyzed GLOBE data from 5 global locations.
  - Correlated geographic location with temperature variance.
- **RESULT:** Confirmed connection between local climate stability and geographic data.

MISSION DATA FILE

STATUS: COMPLETE

PROTOCOL 02: BIOSPHERE

Leaf Classification

TARGET: 5th Grade (12 Students)

INQUIRY: Can we build a scientific classification system?

OPERATION:

- Collection of local specimens.
- Development of hierarchy criteria (MUC System).
- Group taxonomy discussions.

RESULT: High engagement from neuroatypical students; critical collaborative skills unlocked.

STATUS: COMPLETE

PROTOCOL 03: HYDROSPHERE

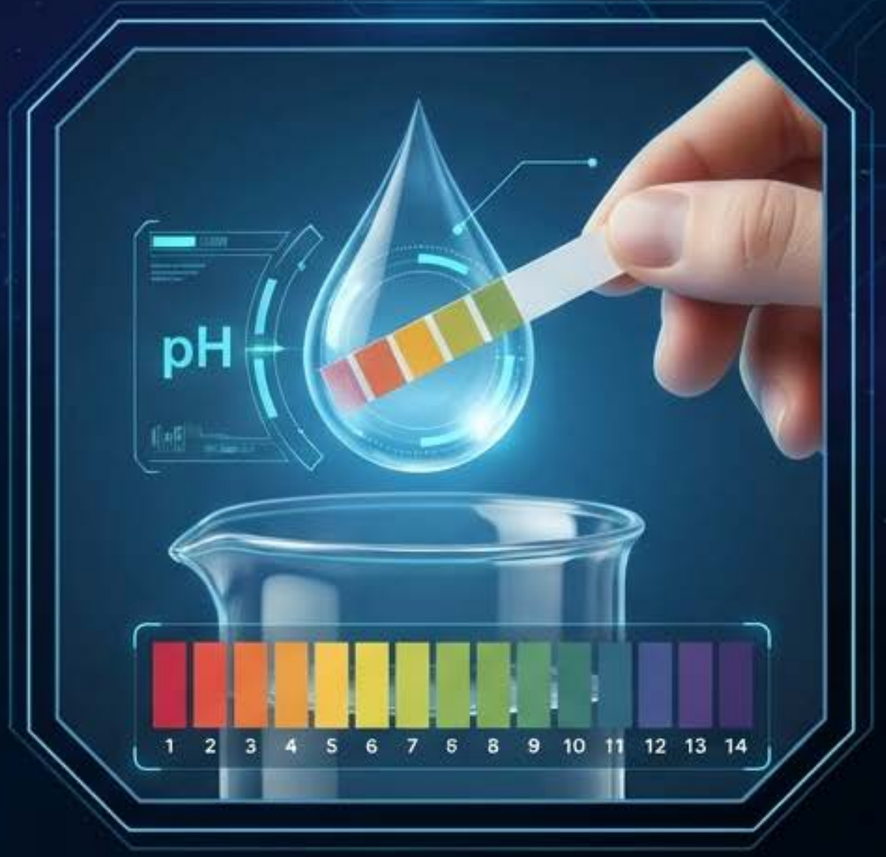
Water Detectives

TARGET: 9th Grade (22 Students)

INQUIRY: How do human activities affect water pH?

OPERATION:
- Sensory analysis (sight/smell).
- Chemical testing with pH indicators.
- Comparison with standard pH scales.

RESULT: Passive students converted to active participants; clear grasp of acidity concepts.



STATUS: COMPLETE

PROTOCOL 04: PEDOSPHERE

Soil Properties

TARGET: 8th Grade (15 Students)

INQUIRY: How does soil structure affect water infiltration?

OPERATION:
- Construction of PET bottle filtration devices.
- Measurement of permeability and saturation times.

RESULT: Visual confirmation of soil texture differences and retention capacity.

STATUS: COMPLETE

PROTOCOL 05: EARTH SYSTEM

Interconnections

TARGET: 7th Grade (13 Students)

INQUIRY: How do Earth's spheres interact?

OPERATION:
- Satellite image analysis.
- 'Water Drop Narrative' mapping.
- Diagramming links: Atmosphere, Hydrosphere, Biosphere, Pedosphere.

RESULT: Students demonstrated 'Systems Thinking' by linking isolated elements.

STATUS: COMPLETE

MISSION STATUS: SUCCESS

90
Students Impacted
(5th-9th Grade)

10
Days of Intensive
Science
(Oct 27 - Nov 6)

100%
Hands-On
Participation

ANALYSIS: Significant increase in engagement from neuroatypical and historically disengaged students.

NAVIGATING CHALLENGES

BARRIER

1. INFRASTRUCTURE:
No dedicated Science Laboratory.

2. LOGISTICS:
Time constraints & Teacher overload.

SOLUTION

1. ADAPTATION:
Creative use of regular classrooms & early setup.

2. TASK FORCE:
Grouping activities & simultaneous sessions.

STATUS: ACTIVE

THE VERDICT

Core Finding: Structured GLOBE activities are a feasible pathway to strengthen scientific literacy.

- PROMOTES STUDENT AGENCY
- ENSURES INCLUSIVITY
- SCALABLE IN RURAL CONTEXTS

PARTNERS IN EDUCATION

Meninas no Espaço Project
Escola Estadual Professora Maria das Graças Silva Germano

SCIENTIFIC LITERACY | CITIZEN SCIENCE | INQUIRY-BASED LEARNING