



GLOBE in Early Childhood Education

When 4-6 Year Olds Become NASA Climate Researchers

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RESEARCH QUESTION & PROJECT SCOPE

Can children aged 4-6 meaningfully participate in authentic scientific research through an adapted GLOBE program?

225

**Scientific
Measurements**

Collected over 14 months

32

**Young
Researchers**

Ages 4-6 (Pre-readers)

1st

**Kindergarten -
in Israel**

To implement GLOBE protocols

- ✓ Demonstrates scientific capabilities in pre-readers
- ✓ Changes perception of early STEM education
- ✓ Provides a scalable model for global implementation

THE CHALLENGE AND OUR INNOVATION

THE GAP

- GLOBE program typically targets elementary students and above.
- Target group (ages 4-6) consists of pre-readers (illiterate).
- Standard tools are often too large for small hands to manipulate.



THE INNOVATION

- **Protocol Adaptation:** Scientific rigor preserved, but physical access modified.
- **Digital Ecosystem:** Custom Hebrew voice-supported apps allow pre-readers to input data.
- **Interactive Learning:** Gamified cloud identification and daily 'Weather Monitor' roles.

Innovation Thinking: Making authentic research accessible to illiterate children through independent data collection.

PHYSICAL ADAPTATION: THE CUSTOM STATION



Key Features:

- **Three-Height Logic:** The board is physically divided into Low, Medium, and High sections to teach cloud altitude intuitively.
- **Authentic Reference:** Uses photos taken by the children as reference cards, not stock images.
- **Accessibility:** Positioned at eye-level for 4-year-olds to allow independent comparison.
- **Visual Documentation:** A clothesline system for pinning observations, requiring no reading skills.

TECHNOLOGY INTEGRATION & DIGITAL ECOSYSTEM



The NASA Connection

- Utilization of GLOBE Observer App for satellite overpass notifications.
- Photography from 6 distinct angles + Digital Compass integration.



The Custom Solution (Bridging the Gap)

- **Hebrew Voice Support:** Custom apps developed with audio guidance for pre-readers.
- **Digital Research Corner:** Microscope connected to tablets for micro-observation.
- **Data Visualization:** Daily logging and weekly summary graphs designed for visual interpretation rather than text analysis.

DATA COLLECTION & METRICS



225

Authentic Scientific Measurements

Collected consistently over 14+ months (Oct 2024 - Present)

Data Types Collected

- Cloud Types (Cumulus, Stratus, Cirrus, etc.)
- Cloud Coverage & Opacity
- Sky Conditions & Visibility
- Temperature Readings
- Precipitation Levels

“Data is submitted directly to NASA's global database in real-time, contributing to valid climate research.”

THE DAILY ROUTINE: "WEATHER MONITORS"



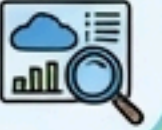
1 Morning Observation

Designated "Weather Monitors" start the day outside.



2 Identification

Using the "Cloud Atlas" and reference photos to identify formations.



3 Digital Entry

Recording temperature and conditions using the digital station.



4 Documentation

Marking the visual whiteboard charts.



Note: This routine builds responsibility, consistency, and systematic working habits from age 4.

SKILLS ACQUIRED & EDUCATIONAL IMPACT



Scientific Literacy

- Mastery of meteorological terminology.
- Understanding the correlation between cloud types and weather patterns.

Digital Literacy

- Independent navigation of touchscreen interfaces.
- Understanding data entry and digital recording tools.

Inquiry Skills

- Observation, comparison, prediction, and classification.
- Transitioning from passive observers to active researchers.

THE TRANSFORMATION JOURNEY

October 2024 (The Beginning)

- Recognition of simple 'clouds' only.
- Required heavy adult guidance.
- Limited vocabulary ('rain,' 'sun').



January 2026 (The Present)

- Identification of complex formations (Alto cumulus, Contrails).
- Complete independence in data collection.
- Confident use of scientific instruments.

Scientific capability develops through practice and trust, not just age.

COMMUNITY ENGAGEMENT & ART INTEGRATION



STEAM in Action

- **Cloud Creation Workshops:** Using cotton, watercolors, and clay to model cloud types.
- **Photography Exhibitions:** Curating galleries of sky observations.

Family & Community

- **Pilot Parents:** Parents who are pilots contribute aerial photos of clouds from above.
- **Weekend Observations:** Children leading their families in weather monitoring at home.
- **Kibbutz Connection:** Integrating the kindergarten's work with the wider community.



KEY FINDINGS & CONCLUSIONS

Children aged 4-6 ARE capable of meaningful participation in authentic scientific research when provided with adapted tools.

- 225 measurements taken with high accuracy.
- Sustained engagement over 14+ months (not a short-term project).
- Successful use of NASA protocols without compromising rigor.

Technology with audio support successfully bridges the literacy gap, allowing pre-readers to function as data scientists.

RECOGNITION & AWARDS



National Recognition

- ✔ Educational Pioneer Principal Award 2025 (Haifa District Winner).
- ✔ Selected to represent the district at the National Committee (Ministry of Education, Israel).

International Recognition

- ✔ Featured in NASA GLOBE Stars Program.
- ✔ Contributing data to GLOBE's 30th Anniversary celebrations.
- ✔ First Kindergarten in Israel to implement full GLOBE protocols.

FUTURE DIRECTIONS: EXPANDING THE MODEL

New Protocols:

- Expanding beyond Atmosphere to Biosphere (Trees) and Pedosphere (Soil) protocols.
- Integrating seasonal tracking of local flora.

Scaling Up:

- Developing training materials for other kindergarten teachers.
- Creating a 'Kit' based on our custom station and digital tools.
- Goal: To replicate the Ha'Etz HaGadol model in kindergartens worldwide.





VSS 2026 BADGE QUALIFICATIONS

Badge 1: Collaboration

Evidence:
Partnership between students, teachers, pilot parents, and the Kibbutz community.

Badge 2: Community Impact

Evidence:
Raising environmental awareness in the Kibbutz; first early childhood implementation in Israel.

Badge 3: Connection to STEM Professional

Evidence:
Certified GLOBE Instructor leading the project; direct data submission to NASA scientists.

Badge 4: Engineering Solution

Evidence: Design and construction of the custom three-height observation station and audio-app ecosystem.

Badge 5: Data Science

Evidence:
Collection, recording, and visualization of meteorological data over a 14-month period.

CONCLUSION

Final Statement:

Age is not a barrier to science—it is a starting point.

- 225 Measurements
- 32 Young Scientists
- One Shared Planet

Join us in reimagining early childhood STEM education.

