



How Musical Linguistics  
can empower GLOBE adoption  
by combining citizen science  
in existing classes plus  
using the adjacent outdoors.

**Cynthyny Lebo**

New Educations Options, Los Angeles, CA

**Janet Struble**

GLOBE Mission Earth, Toledo, OH

**Julie Houck, STEAM EL Teacher**

Defiance Elementary School  
Defiance, OH





### Expanded Work with GLOBE Mission Earth and the University of Toledo

After challenges working on site outdoors at Earth Heart Farms 80 acres, we proposed to engage first grade Defiance Elementary School students in units of 10 minutes per unit totaling 20 minutes in a 45-minute period, working with a primary GLOBE instructor Julie Houck, in a known enriched setting (STEAM classroom with adjacent garden) with the master Musical Linguistics teacher Bo Lebo online.

It took 4.5 months to organize a 7-week program, operating 3 days a week. We chose to be stationary (in place in Julie's classroom). We chose to make the observations simpler and inclusive of Nature-based learning styles, STEAM, drum circles, call and response instruction, risk-taking, and data collection.

The students had three mainstays: the way the room was furnished and set up to facilitate them to participate, their teacher, and myself online.



Earth Heart Farms Students  
Vicki Rae Harder-Thorne, Facilitator.

Defiance Elementary School Students  
Julie Houck, Teacher)



#### Questions:

- Could I teach successfully by Zoom and not be in the room?
  - Could dialogue, practice, and going out to collect data be meaningful and fulfilling?
  - Could drumming engage them and forward their learning?
- It turned out the answers were all YES!**



## The Team

**Lead Teacher** : Julie Houck is a NOAA Planet Stewart (2021) and a K5 Elementary teacher in Defiance, Ohio. She is a journal published author and GLOBE instructor, a My NASA GLOBE product reviewer, an NSTA member and an Ohio STEM Learning Network Fellow, with 3 years working within GLOBE Mission Earth.

**Musical Linguistics Inventor** : Bo Lebo , M.A., Director of New Educations Options, has been developing and applying Musical Linguistics in classrooms and community settings for two decades. The theory and design of Musical Linguistics is available for download at <https://scholarworks.lib.csusb.edu/etd-project/3389>

**Strategic Advisor** : Janet Struble : former GLOBE Mission Earth Project Manager has been involved with GLOBE since 2000.



**Want to collaborate? Let us know about you!**





# The GLOBE Program

#GLOBEMeeting2024

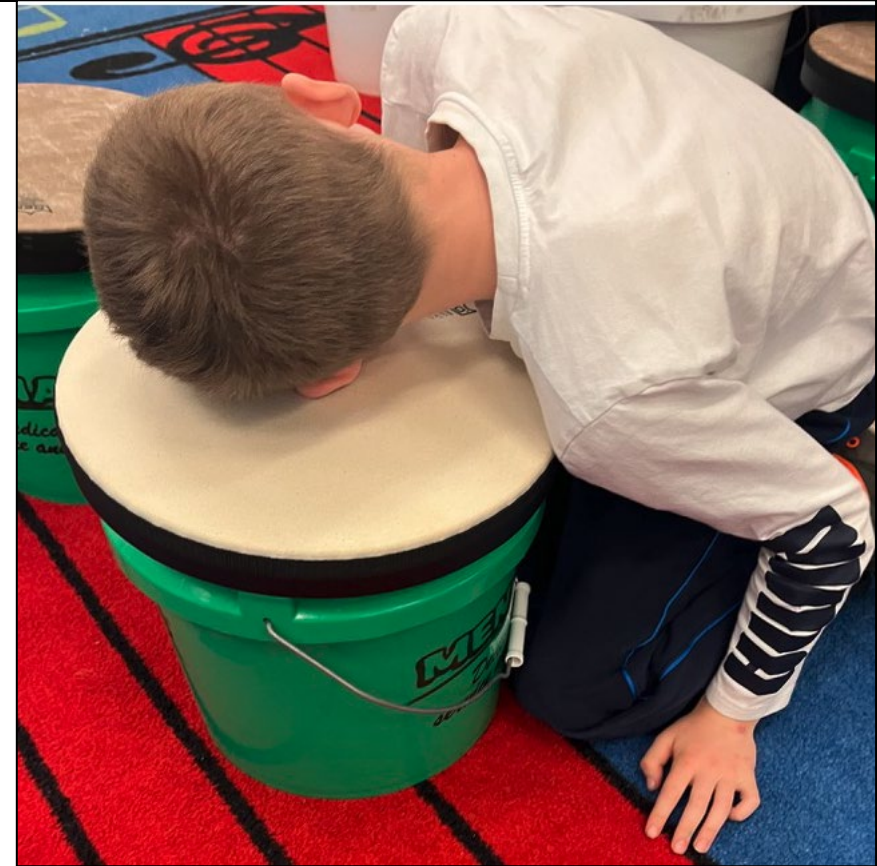


ear	thanks	see
hear	thank you	perceive
noise	you're	sight
sound	welcome	vision

We worked with language, math, music, and science to stimulate group and individual success in academics, STEM observations, and working with others.

They learned to translate sign language, and symbols into protocols for team building, working together, gathering data and having fun.

Between 2021 and 2024, we demonstrated a new paradigm that is worthy of more study and implementation.



Children responded with curiosity and passion. We began with the youngest GLOBE explorers yet. From 2021-2024, NEO provided Musical Linguistics to students from 12th grade to the 1st grade level. The response was YES to SCIENCE and to GLOBE studies on campus and outdoors.



## Real world engagement creates enthusiasm

- **Varying Realia** : Seeing feathers, mock nests, miniature eggs, photos, and sounds of species, differentiated by color, species, function, and migration, nesting, geographic/place-based, seasonal residencies and annual variations.
- **Changing Heartbeats** : Using tempo, beat, rhythm and melody to help with communication, focus, teambuilding, and musical messages. Breathing, bearing weight, rhythmic moving and listening to others. Everyone invited to add something to express oneself and add to the conversation.





## Musical Linguistics builds rapport in the classroom

- Coordinate content with outdoor and indoor seasonal observations
- Use music and drumming to pace, enliven, challenge and support young learners
- Start together, stop together, learn to say what you want to see, write conclusions, organize data using forms
- Go outside, work as teams to solve problems, be socially self expressed, supportive of others to propose options, and collaborate on solutions





# The GLOBE Program

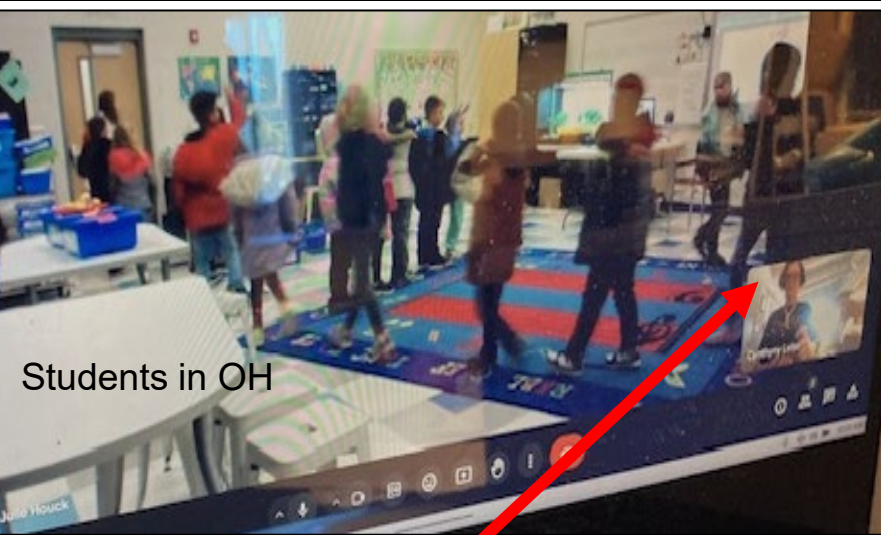
#GLOBEMeeting2024

With 7 weeks to go before the end of the year, we did a program in time to go **virtual!** These are the **results!**

- Kids Sharing their art and Appreciation
- Over the screen back to Teacher 2 (Ms. Bo).
- Three Way communications:
  - between the kids and Ms Bo
  - between their teacher & each other
  - with an academic observer/guest.



Students drawing above Grade 1 level

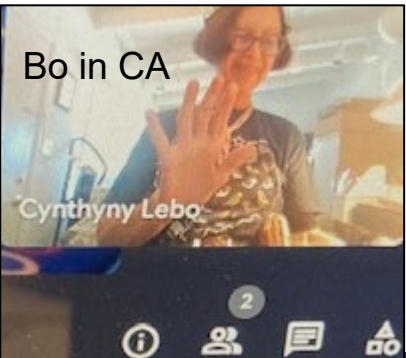


Students in OH

STEAM Classroom--  
20 students  
and 2 screens  
Teacher 1- DEL

Students made choices.  
Followed directions.  
Learned to play in unison.  
Learned a new song about a Blue Bird.  
Remembered the words and the movements.  
Went outside to observe the world.  
Came in and used words to describe what they saw.  
That became a creative sharing process as they transformed their comments into a song.

They learned how to stop or start, Listen, See, or be quiet in sign language. They learned how that could help in collecting data and being able to bird watch.  
They explored bird calls, bird books, drawing bird anatomy and using new words melodically and rhythmically and to share the experience with kindness, thoughtfulness and gratitude. (Now, they can sign thank you.)



Bo in CA

Cynthia Lebo



## How Musical Linguistics empowers elementary students to use GLOBE in their core studies and become Citizen Scientists by:



**THE GLOBE PROGRAM**  
CONNECTING THE NEXT GENERATION OF SCIENTISTS

- **Adding new vocabularies** and learning styles to measurements and meaning-making.
- **Bringing a systems -based inquiry process**, based on Big Picture problem-solving, to a personal *and* team-based environment.
- **Using solo and group experiences** to make content memorable through communication of ideas both in the classroom or over distances.
- **Realtime responses** with listening, hearing, writing, responding, and collaborating.
- **Learning to read symbols and signs** leading to successful STEM, academic English, attendance, and new kinds of focused studying.
- **Making charts, keeping journals, and submitting GLOBE data.**

See Elementary GLOBE storybooks and classroom content or Figure 2, page 18, EPA Pie Chart with 3 letter symbols, Green House Gas Emissions and Sinks, 1990-2012, Example from J. Houck, The Earth Scientist, Summer 2023 article







## Student sharing shows how easily they can become scientists

- Collective sharing out demonstrated the students had hung in with the hybrid format and benefited.
- Children brought pictures of birds and objects that impressed them over to the computer screen to share their excitement (they did a virtual show and tell).
- Students were responsive to and helped others.
- They made thank you cards on the spot to share their excitement.





## Student Reactions

"Musical Linguistics involved both my favorite things: Nature and Music."

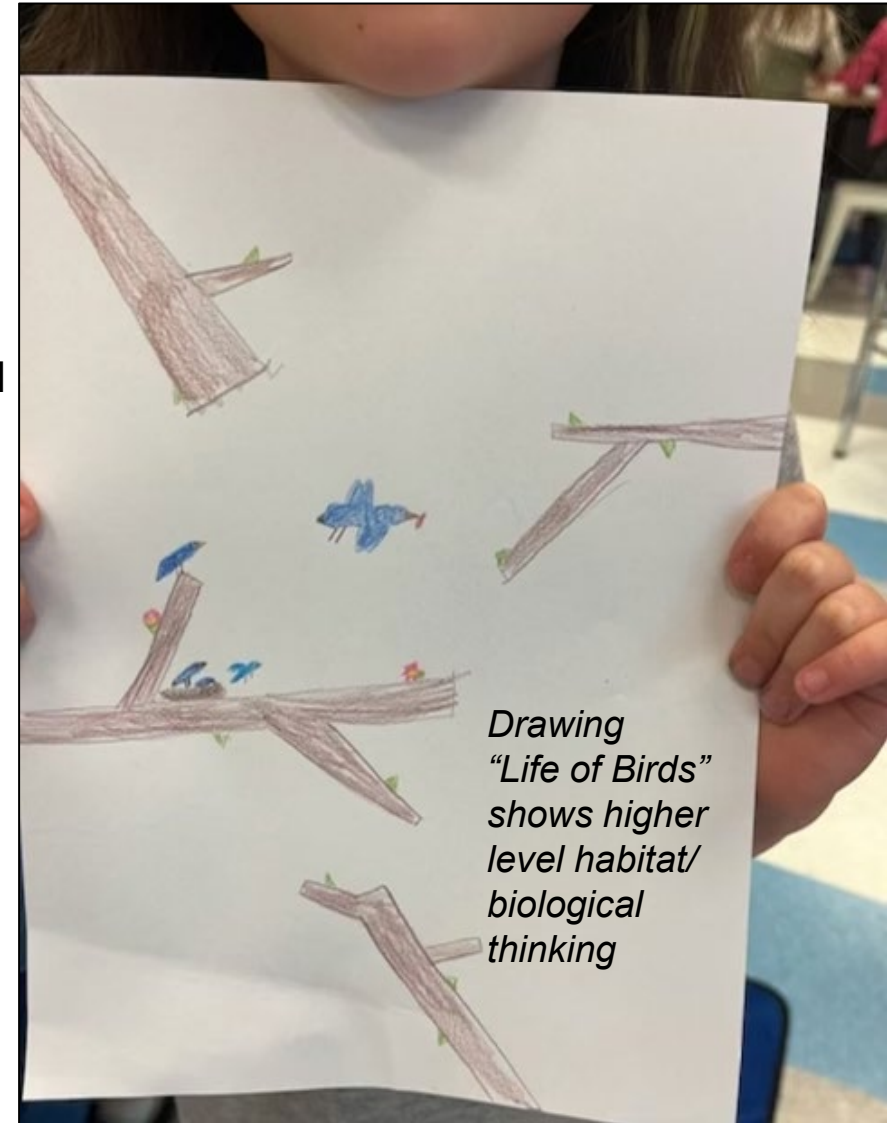
"It gave me a calm feeling the way we pounded on our hearts and to the beat of the drum."

"This class was my favorite because I learned about important life skills, and the teacher was a great one. It was a fun space to just be yourself."

## Teacher Reactions:

"Musical linguistics ... engaged the students and made learning more enjoyable and stimulating. It encouraged them to ask questions, explore, investigate, and help foster a love for learning and discovery."

"The students were able to observe, share their observations, and connect it to hands-on activities. We were able to incorporate the GLOBE protocols and let students learn through authentic learning experiences."



*Drawing "Life of Birds" shows higher level habitat/ biological thinking*



**Our 3-D Printed Class Mascot (STEM)**  
Theme Song (STEAM)  
*A North Eastern Blue Bird Representation*





### Contact Information

**Cynthyny (Bo) Lebo** : New Education Options, NEO Director, and Musical Linguistics Trainer, [bolebo@duck.com](mailto:bolebo@duck.com)

**Julie Houck** : Primary school teacher [jhouck@defianceschools.net](mailto:jhouck@defianceschools.net) Penney Nature Reserve explorer with the Defiance Soil and Water Department. (<https://defianceswcd.org/penney-nature-center.html>)

**Janet Struble** : Former GLOBE Mission Earth Project Manager, University of Toledo, Past officer of Black Swamp Blues Society, SECO District 1 Director 2015-2018, NSTA District X Director 2012-2015, SECO President 2010-2011. [janetstruble2@gmail.com](mailto:janetstruble2@gmail.com)

**Vicki Rae Harder Thorne** : Owner, Earth Heart Farms, Colleague and defender of land and wildlife. [earthheartfarms@gmail.com](mailto:earthheartfarms@gmail.com)

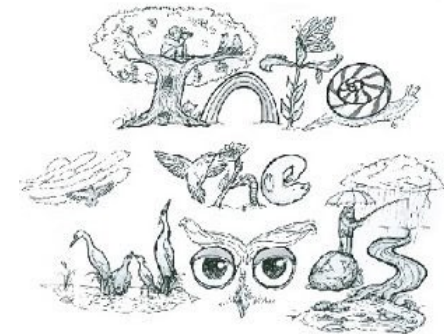
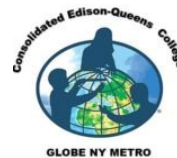
Bo Lebo uses “a full range of relevant, rigorous and joyous interventions that include multiple intelligences, student portfolios, journals, teamwork and hard science delivered in a way that assists students, teachers, educational observers and staff to adopt STEAM as a way to meet state, school site, and classroom needs as well as make STEM fun, sticky, while supporting children at risk, second language learners, embracing urban, rural or suburban student interests.”

-- **Peter Schmidt, Associate Director GLOBE NY Metro Program,** Queens College, Flushing, NY

### Many Thanks to our Partners!



Defiance Elementary School

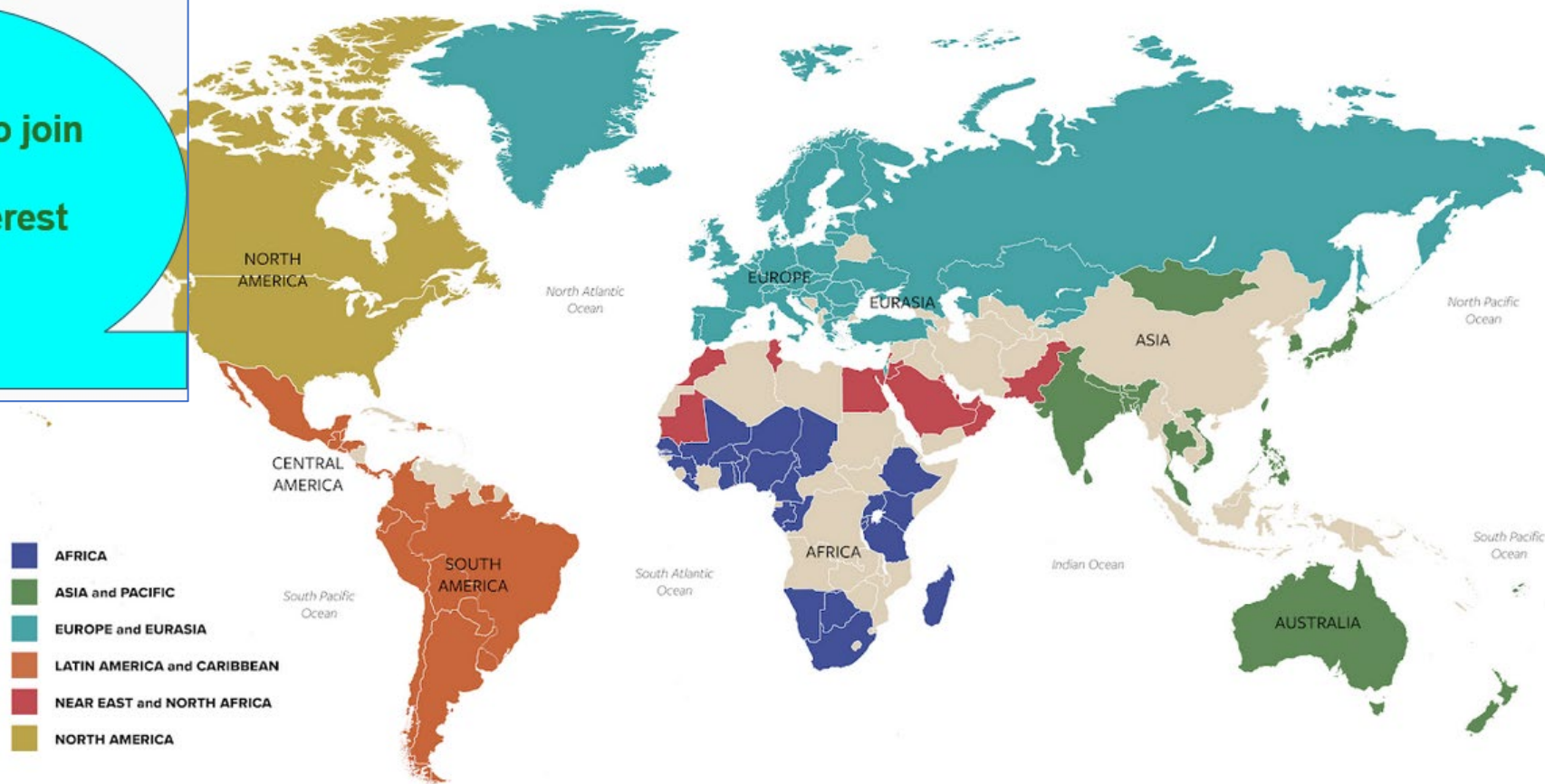




# The GLOBE Program

#GLOBEMeeting2024

Would you like to join us and start Special Interest GLOBE group?



Let's put the A in STEM!

Join a Special Interest Group

Contact me at our Office 424-332-6552

Thank you,  
Cynthny (Bo) Lebo

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