



# Examining Strategies to Enhance Preschool Science Instruction

Incorporating science into everyday conversations helps children learn to reason and understand their own thought processes, which has important implications for their long-term success. A powerful way to improve children’s learning is by engaging in science talk. However, preschool teachers in both the U.S. and Brazil express a lack of scientific knowledge and training to confidently integrate science in their classrooms. As a result, many are reluctant to talk about science with their young students. **Preschool Science Talk in Action and Reflection (PreSTAR)** is a professional development model that aims to enhance preschool science instruction by empowering teachers with tools, resources and a supportive community beyond what is typically provided to early childhood practitioners.

## RESEARCH GOALS

- Investigate teachers’ ideas and reflections about using science in the classroom.
- Examine the change in teachers’ reflections on children’s interactions with science-related materials and their practices over time.
- Examine the change in teachers’ attitudes toward teaching science, as well as the how their science talk changes over time.
- Examine the change in children’s science talk, behavior and engagement levels over time.
- Develop a professional development model focused on science talk, including a set of user-friendly forms to help teachers implement reflective practices in early childhood science education.

## WHY IS THIS RESEARCH NEEDED?

We need a better understanding of the following to improve children’s science learning and teacher training programs:

- The science learning opportunities provided in early childhood classrooms through materials and activities.
- How those opportunities are associated with the knowledge and skills children gain.
- How teachers intentionally reflect on their practices, as well as any missed opportunities for science talk.

## COLLABORATORS

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## LOCATIONS

### São Paulo, SP, Brazil

- EMEI Ignacio (public school)
- Escola do Bairro (private school)



### Lincoln, Nebraska, U.S.

- Two Head Start program sites
- One Kinder Care community child care program site



## RESEARCH SNAPSHOT

# 8

preschool teachers  
(4 in Lincoln & 4 in São Paulo)

# 16

reflection sessions\*  
(4 reflections x 4 teachers)

# 160

children ages 4-5,  
mostly from low-income families

\*Numbers for U.S. teachers only.

## PRELIMINARY FINDINGS

### Teacher Practice

- Between the U.S. and Brazil, there are more similarities in how teachers plan for science activities than differences.
- How teachers actually initiate and implement science activities seems to be different.

### Teacher Reflection

- Although teachers in the U.S. provided significantly deeper levels of reflection as they participated in more reflection sessions, their overall level of reflection was low.
- Teachers in Brazil provided lower-level reflection overall; however, they provided more child-centered reflection as more science-related materials became available.
- The focus of reflection appears to impact the level of reflection, but the association seems to differ between the two countries.

## RECOMMENDATIONS

- Further examine how contextual factors are associated with how teachers implement and reflect on their experiences and observations.
- Prioritize adding new science-related materials to the classroom and allow teachers to closely observe what children do with them.
- Offer teachers opportunities to reflect on their observations, interactions and evaluate their teaching practices.



*Brazil preschool site: Activity exploring life science.*



*U.S. preschool site: Activity exploring the relationship between properties of objects and the distance cars travel.*

## What's next?

### In future studies, we would like to:

- Study how the level of teachers' reflection on their science teaching changes with a greater number of reflection sessions and how their ability to deeply reflect on their practices changes their actual practices.
- Create a set of professional development resources for teachers using the resources that were developed and used in the pilot impact study.
- Develop a secure website for researchers and teachers that serves as a forum to share journal entries, plans and reflection notes. This online platform will also allow teachers to share information with families.