# Games for Young Mathematicians: Promoting Mathematics Engagement in Head Start Preschoolers' Learning Environments

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## Introduction

- Young children's early math experiences strongly impact long-term academic success [1]
- Differences in math knowledge are evident before kindergarten [2]
- Teachers and families alike share the common goal of wanting children to succeed [3]
- Early learning environments (e.g., school and home) are critical targets for intervention [4]

## Purpose

To research and develop an intervention that transforms the math learning environments of preschoolers who have historically been denied equitable access to early math.

## YM Intervention

- Teacher PD course in early math content, family engagement in math, & math mindsets
- Playful instructional math games for home and school
- Classroom sets of math game materials and directions
- Teacher and family "How to Play" videos in 3 languages
- Family math games and minibooks
- Family math texting prompts
- Website for all resources

## Teacher PD

- A blended model of in-person and virtual sessions
- Starting November 2022 and continuing ~every two weeks through early May 2023
- Total of 11 sessions (17.5 hours)
- Between sessions, teachers played the YM games and sent home family math games, minibooks, instructions that align with the classroom activities
- PD in English and Spanish
- Ecologically-valid

## Connecting home and school through games

**Scan the QR code to watch a video of "How to Play" Jumping on the LilyPads


## YM Math Games

- Finger Play Games
- Dot Card Games
- Sorting and Shape Games
- Pattern Block Shape Puzzles
- Number Path Games
- Obstacle Course
- Roll One and Roll Two
- Pattern Games
- Measurement and Data Activities
- Card Games


## Research Design

Cluster-RCT field study with 34 Head Start classrooms to measure the impact of YM on preschoolers' math learning

**Child Measures**

1. The Research-Based Early Math Assessment-Brief [5]
2. Data Collection and Analysis Child Assessment (DCA) [6]
3. Spatial Orientation Assessment Tasks (SOAT) [7]

**SOAT Assessment Materials**

**Teacher and Family Measures**

1. Family and Teacher pre/post surveys (comfort with early math; math engagement)

## Field Study 2022-2023

- Create intentional supports in early math to foster equitable learning opportunities
- Provide visual guides/instructional tips to support math game play with simple text, less formal voice
- Include scaffolded exposure to math vocabulary and concepts for teachers and families
- Offer multilingual resources for teachers to support family math
- Support teachers and families as partners in children's learning as pandemic highlighted this critical relationship
- Bridge home and school environments with math games

## Potential Impact

- Freely available intervention materials, strategies & resources in Spanish, English, and Portuguese, supports early math learning at home and school
- Builds evidence that an ecologically-valid intervention can promote the math knowledge of young children who have historically been denied equitable access to early math learning experiences including multilingual learners
- YM math games can engender positive math attitudes in teachers, families, and children
- Disseminate findings to academic, policy, and practitioner communities to improve math instruction and family math practices


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