PLAY

MMSA Bowdoin Samara Early Learning

In collaboration with the Maine Mathematics and Science Alliance, Bowdoin College, and Samara Early Learning, this project will explore how preschoolers and kindergarteners can engage in science and engineering practices through play. Professional learning modules and peer coaching sessions will support early childhood educators to enhance and extend children's play-based learning.

"WHEN PROVIDED WITH OPEN-ENDED MATERIALS AND AN ABUNDANCE OF TIME, CHILDREN DO THEIR MOST VALUABLE LEARNING THROUGH PLAY."

JESSICA LEWIS
Owner, Director, and Teacher
Inch by Inch Preschool

https://mmsa.org/projects/play/

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Bridging Preschool and Kindergarten Science: Exploring Play-based Engagement with Scientific and Engineering Practices in Early Learning Environments

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Background

Play is recognized internationally as the primary way young children make sense of the world and a fundamental component of their development (Howes & Smith 1995; Larimore, 2020; Norodahl & Johannesson 2016; Pellegrini 2011; Weldemariam 2014). Young children naturally engage in **science and engineering practices** through play in sophisticated and robust ways (Miller & Eshoo, 2023; Miller & Saenz, 2021). They are curious about the world, pose questions, investigate their surroundings, and make sense of evidence gathered through play to help answer their questions. Such engagements frequently happen with little prompting and result in deep scientific exploration, which serves as a critical stepping stone for sensemaking in later years.

Research Questions

Focus 1: Teacher understanding and instructional change around supporting students' engagement with scientific and engineering practice (SEP).

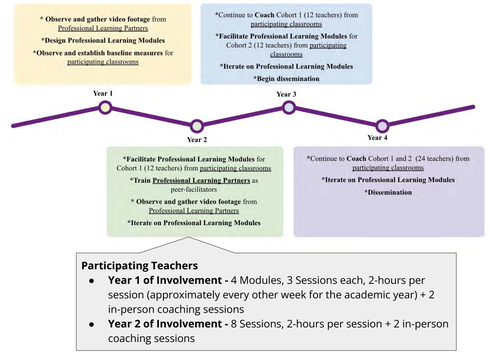
RQ1: What are the key design elements of the SciEPOP tool and surrounding professional learning experiences needed to support children's' engagement with SEP?

RQ2: How does the SciEPOP tool during professional learning progressively enhance teachers abilities to support children's' engagement with SEP in play?

Focus 2: Preschool and Kindergarten classroom-level engagement with SEP with play.

RQ3: How does professional learning intervention impact classroom-level patterns of children's engagement with SEP during play?

RQ4: How does professional learning impact site and classroom-level beliefs and attitudes about SEP during play?



Participating Teachers

- **Year 1 of Involvement -** 4 Modules, 3 Sessions each, 2-hours per session (approximately every other week for the academic year) + 2 in-person coaching sessions
- **Year 2 of Involvement -** 8 Sessions, 2-hours per session + 2 in-person coaching sessions

Professional Learning Design

Year 1: Professional learning modules for PreK and K educators to recognize, deepen, and extend children's natural engagements with SEPs through play while leveraging the SciEPOP as a powerful professional learning tool. **Modules will showcase video-based examples of children in play** to engage educators in recognizing a) **play**, b) the **scientific phenomena children explore** in that play, and c) **SEPs children engage with during play**. In addition to the modules, educators will engage in three coaching cycles with a skilled facilitator.

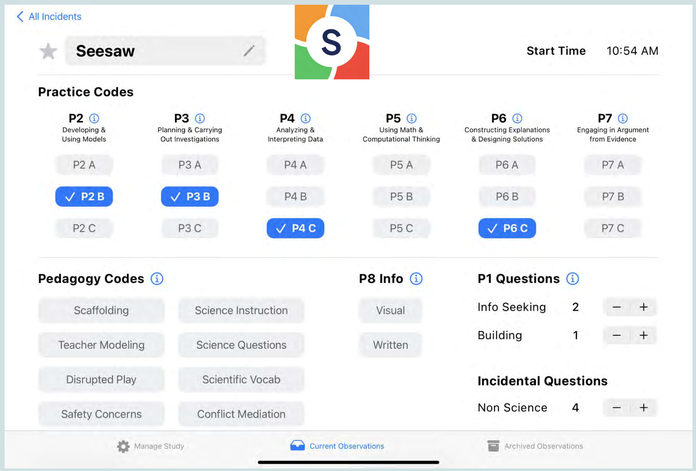
Module 1: Exploring Science in Our Play
Module 2: Noticing Science in Our Play
Module 3: Constructing Science in Our Play
Module 4: Understanding Science in Our Play
Site Visits: Coaching Cycles with a Skilled Facilitator

Year 2: Educators will continue developing their skills through four facilitated peer coaching sessions. **During these small group sessions, educators will set intentions, share artifacts from practice, reflect on and grow their practice, and provide peer feedback**. This year will include three more in-person coaching cycles with a skilled facilitator.

Images below capture children engaged in scientific practices during play. Using the SciEPOP, we highlight the SEPs - **Analyzing and interpreting data, Arguing with Evidence, and Designing Solutions**

SciEPOP - Science and Engineering Practices Observation Protocol

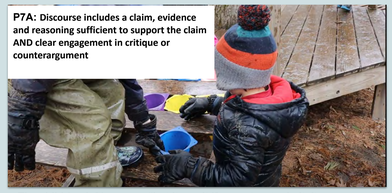
- Designed for observation of play
- Benchmarked to NGSS targets & Pre-K developmental levels
- Focused on site-level observations
- A = Exemplary, B = Efficient, and C = Emergent



Outdoor Formula and Gas - Children putting water in each cone pretending that they are putting formula and gas.

The cone doesn't fit like the others. Child (on left) puts cone sideways in space to keep it "balanced."

Another child (on right) moves cone to try and balance it similar to other cones, but it barely holds it and says, "Yes, I balanced it!"



The child (on left) argues, "but it won't if we put water in it, it won't." Second child replies, "oh yeah." Child on left puts it back.

Outdoor Bridge Building - Children putting together boards over tires to make a bridge.

Child walking across after fixing wobbly boards, "We worked hard on this I hope this works."

Another board falls down, the child says, "we need something to keep it up." The teacher encourages them to look around and think of a variety of items they could use.

The children and teacher discuss using sticks and logs. The child with the orange hat suggests using a crate, they try it together.