The Roots of STEM Success:

Changing Early Learning Experiences to Build Lifelong Thinking Skills

Barriers:

Additionally, adults struggle to reimagine science and mathematics as a flexible or collaborative problem-solving process. While new school-based standards demand a shift in approach, with less rote memorization and more opportunity for creative, team-based, and iterative problem solving (such as we see in the modern workplace), teachers and parents alike tend to hold on to preconceived ideas of what makes for good learning, often reverting back to their own experiences of math and science instruction and asking children to recall information, rather than do challenging thinking and questioning.

While most teachers and parents would find it unthinkable to say to their children, “I’m a terrible reader,” it is all too common to hear adults declare that they, “have never been good at math.” Research demonstrates that these messages shape children’s mindsets significantly and have particularly

And while children use technological devices as the medium for playing with apps, there is minimal learning *about* technology embedded in most apps. Additionally, research shows that technology-based learning is most effective for children in preschool and early elementary school when it is coupled with interaction, conversation, and support from adults (Donohue & Schomburg, 2017).

**Key Findings:**

1. STEM thinking begins in infancy
2. To become strong STEM thinkers, children need more play
3. STEM amplifies language development; language enables STEM thinking
4. Active, self-directed learning builds STEM skills and interest
5. Mindset matters to STEM success
6. Children’s abstract thinking potential can be unlocked through both adult support and executive function skill development