



1

By providing equitable opportunities, all children, regardless of ability, race, ethnicity, language, and cultural background, will be able to participate in STEM (Clements et al., 2021).

2

Individualizing instruction on STEM knowledge for students with learning differences increases student achievement (Kasee & Rayfield, 2019).

3

Students with disabilities want careers in STEM fields (Bittinger, Wells, & Kimball, 2021).

**ALL CHILDREN,
REGARDLESS OF ABILITY,
CULTURE,
RACE/ETHNICITY,
GENDER, AGE, AND/OR
SOCIOECONOMIC
STATUS, HAVE THE
INTEREST AND CAPACITY
TO ENGAGE IN STEM
LEARNING EXPERIENCES.**



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



Follow the child's lead and interests.



Video: [STEM Starts Now](#)



Videos: [Why Inclusion](#)



STEMIE Resource: [A Guide to Adaptations](#)



STEMIE Resource: [A Guide to Teaching Practices](#)



STEMIE's [Curated Book Lists about STEM Innovators from multiple cultures](#)



1

By planning learning experiences based upon children's interests, we can ensure that teaching and learning is meaningful and relevant to all children (Birbili, 2019; Dunst et al., 2011).

2

Children's interests and adult interaction styles are important factors in the development of early numeracy skills (Lukie et al., 2014).

3

Understanding children's strengths and interests can help adults support their development and learning (NAEYC, 2020).

BY FOLLOWING CHILDREN'S INTERESTS, ADULTS CAN ENGAGE IN RESPONSIVE INTERACTIONS AND NECESSARY ADAPTATIONS TO SUPPORT ALL CHILDREN, INCLUDING CHILDREN WITH INVISIBLE DISABILITIES.



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



Reflect on your beliefs and bias about children with disabilities.



STEMIE Resource: A Guide to Teaching Practices



STEMIE Resource: A How-To Guide for Storybook Adaptations



STEMIE Resource: A Guide to Adaptations



STEMIE PD Series: Adaptations for Everyday Routines & Activities: Making STEM Happen for Infants & Toddlers



Image credit: Martin do Nascimento/Resolve Magazine

1

Students with learning differences included in general education settings achieved higher on reading and math assessments than students in non-inclusive settings. (Cole, Murphy, & Robinson, 2022).

2

When high expectations are infused into classroom practices, these can potentially have a positive impact on the development of children who are deaf or hard of hearing (Wang et al., 2014).

3

When a culture of high expectations is established for STEM learning, students seem to have positive beliefs about their ability to do STEM (Murphy, 2020).

ALL YOUNG CHILDREN ARE CAPABLE OF LEARNING AND ACHIEVING SUCCESS, AND THEY LEARN BEST WHEN ADULTS IN THEIR LIVES HOLD THEM TO HIGH EXPECTATIONS.



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



Reflect on your beliefs and bias about children with disabilities.



Video: [STEM Starts Now](#)



Videos: [Why Inclusion](#)



[Early Childhood Recommended Practices Module: Interaction](#)



1

The interaction between parents and their children (e.g., math talk) provides children with opportunities to engage in math learning in a naturalistic context, such as mealtimes, (Susperreguy & Davis-Kean, 2016).

2

Teachers who provide a supportive learning environment to students with disabilities lead to higher levels of engagement in STEM courses (So et al., 2022).

3

Supporting peer interactions during STEM activities might lead to positive math learning outcomes (Trawick-Smith et al., 2017).

CHILDREN LEARN IN THE CONTEXT OF SUPPORTIVE COMMUNITIES, THROUGH POSITIVE INTERACTIONS WITH PEERS AND ADULTS.



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



Encourage and respond to children's interests.



STEM4EC Blog: [Mythbuster Series #4](#)



[Early Childhood Recommended Practices Module: Interaction](#)



STEMIE Resource: [A Guide to Adaptations](#)



STEMIE Resource: [A Guide to Teaching Practices](#)



[How to Motivate Children: Science-Based Approaches for Parents, Caregivers, and Teacher](#)



- 1 Children in rural communities experience challenges gaining access to EI services and receiving ongoing support from qualified EI providers, which suggest that they may be less likely to experience positive outcomes. (Mello et al., 2016).
- 2 Children of migrant and seasonal farmworkers face challenges finding qualified teachers to support their education needs (Rivera-Singletary & Cranston-Gingras, 2020).
- 3 Immigrant children with disabilities face challenges accessing support and services because of language barriers (Khanlou et al., 2015).

WHILE ALL CHILDREN ARE MOTIVATED TO LEARN, CHILDREN WHO ARE FROM UNDERSERVED COMMUNITIES AND/OR WITH DISABILITIES ARE OFTEN DENIED OPPORTUNITIES TO REACH THEIR FULL POTENTIAL.



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



Reflect on your beliefs and bias about children with disabilities.



Advancing Equity in Early Childhood Education



STEM4EC Blog: Perspectives: Inclusion Right from the Start



Advancing Racial Equity in Early Intervention and Preschool Special Education



How to Motivate Children: Science-Based Approaches for Parents, Caregivers, and Teacher



1

Enrolling in high-quality education leads to many benefits, such as children's cognitive and achievement outcomes (Morgan, 2019).

2

Early childhood teachers' instructional quality predict children's mathematic development (Pohle et al., 2022).

3

High-quality teacher-child interactions benefit children's academic outcomes, such as language and literacy outcomes (Cash et al., 2019).

HIGH QUALITY EARLY EDUCATION AND CARE ENVIRONMENTS HAVE BEEN FOUND TO FACILITATE CHILDREN'S LEARNING, INCLUDING STEM.



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



Peep and the Big Wide World's Teaching Strategies



Videos: Why Inclusion



Join STEMIE's STEM4EC Blog & Professional Learning Community



STEMIE PD Series: Adaptations for Everyday Routines & Activities: Making STEM Happen for Infants & Toddlers



1

Children are learning all the time. Informal learning inspires and cultivates interest in STEM through real-world situations (Berger et al., 2020; Blanchard et al., 2020; Jong et al., 2020).

2

Natural outdoor environment provides an ideal setting for children to learn about science by asking questions and investigating the surrounding (Skalstad & Munkenye, 2021).

3

Activities outside of school play a critical role in cultivating STEM education (Afterschool Alliance, 2016).

MEANINGFUL LEARNING CAN HAPPEN OUTSIDE THE CLASSROOM SETTING, SUCH AS AT HOME AND IN THE COMMUNITY (E.G., MUSEUMS, GROCERY STORE, OUTDOORS).



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



STEMIE Resource: [A Guide to Asking Open-Ended Questions](#)



STEMIE's [Discovery Play Activities With Your Young Child series](#)



STEMIE App: [My STEM Adventure](#) (iOS & Android)



STEM4EC Blog: [Enhance STEM Learning and Participation for Young Children with Disabilities](#)



1

Playful learning experiences that are joyful, meaningful, socially interactive, actively engaging, and iterative can promote deeper learning (Zosh et al., 2017).

2

Outdoor free play may support children's executive function (Koepp et al., 2022), which is a critical foundational skill for STEM learning.

3

Children engage in engineering learning while playing with blocks (Gold & Elicker, 2020).

CHILDREN LEARN THROUGH PLAY AND IN FACT, PLAY IS CRITICAL AND SUPPORTS CHILDREN'S JOYFUL, 'HANDS-ON' EXPLORATION AND LEARNING ACROSS ALL DOMAINS OF DEVELOPMENT (E.G., COGNITIVE, SOCIAL-EMOTIONAL, PHYSICAL, EXECUTIVE FUNCTION, LANGUAGE AND LITERACY, AND STEM).



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



STEM4EC Blog: [Mythbuster Series #4](#)



STEMIE Resource: [A Guide to Asking Open-Ended Questions](#)



The LEGO Foundation: [Learning Through Play](#)



Developmentally Appropriate Practice (DAP) [Position Statement](#)



1

With intentional adult guidance, motor play has the potential to improve all children’s social, communication, pre-academic, and approach to learning skills (Yang & Ostrosky, 2023).

2

With adults' support and scaffold (e.g., embedding STEM talk into storybook reading), children can engage in STEM understanding and thinking (David e al., 2021; Leech et al., 2020).

3

Adult-child interactions during block play may promote learning in spatial concepts (Ferrara et al., 2011)

RESEARCH SUGGESTS THAT ADULT-GUIDED PLAY (E.G., SCAFFOLDING, INTENTIONAL TEACHING) IS EFFECTIVE FOR IMPROVING CHILDREN’S ACADEMIC ACHIEVEMENT AND QUALITY OF YOUNG CHILDREN’S PLAY.



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



Follow the child’s lead and interests.



STEMIE Resource: A Guide to Teaching Practices



Developmentally Appropriate Practice (DAP) Position Statement



STEMIE Resource: A Guide to Asking Open-Ended Questions



STEMIE’s Discovery Play Activities With Your Young Child series



Video: Making STEM Happen for ALL Young Children



1

Universal Design for Learning (UDL) strategies can be used during STEM learning activities to support executive functioning (Vanhear et al., 2022).

2

Science and engineering-enriched contexts can foster children's executive function skills (Bustamante et al., 2018).

3

Engineering play is associated with the executive function skills of children with disabilities (Gold et al., 2021).

**STEM LEARNING
BENEFITS CHILDREN'S
EXECUTIVE
FUNCTIONING, WHICH IS
AN IMPORTANT
PREDICTOR OF
CHILDREN'S SUCCESS IN
READING AND WRITING.**



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



[STEM4EC Blog: What Predicts Success in STEM...and School?](#)



[STEMIE's Storybook Conversations series](#)



[STEMIE's Learning Trajectories](#)





- 1 Integrating math, science, and technology in early childhood education leads to positive changes in children's STEM development (Kermani & Aldemir, 2015).
- 2 Programming robots can be a useful tool to support children's science and engineering learning (Çetin & Demircan, 2020).
- 3 Children can engage in math and engineering learning during block play (Gold & Elicker, 2020; Gold et al., 2020).

STEM STANDS FOR SCIENCE, TECHNOLOGY, ENGINEERING, AND MATH. IN EARLY CHILDHOOD, STEM LEARNING CAN BE INTEGRATED WITH AT LEAST TWO OR MORE DOMAINS IN AN INTENTIONAL, HANDS-ON APPROACH.



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



STEMIE Resource: [A Guide to Asking Open-Ended Questions](#)



STEMIE's [Discovery Play Activities With Your Young Child](#) series



STEMIE Resource: [A Guide to Adaptations](#)



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- 1 Young children (0-5) more readily develop computational thinking skills when engaged in unplugged activities (i.e., activities that do not involve electronics; Bati, 2022).
- 2 Children can engage in computational thinking learning through unplugged, hands-on, and play-based learning activities (Lee et al., 2023).
- 3 Computational thinking is the process of applying principles of computer science to solve problems (Aho, 2012).

TECHNOLOGY IS THE INTRODUCTION OF UNDERLYING CONCEPTS OF BUILDING OR CREATING TECHNOLOGY, INCLUDING COMPUTATIONAL THINKING (DOE & DHHS, 2016).



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



Guiding Principles for Use of Technology with Early Learners



Video: Computational Thinking for Each and Every Child



Video: Ice Cream Sundae Preparation



STEMIE's Daily Routine Explorations With Your Young Child series



STEMIE's talkABLE: Computational Thinking in Early Childhood



STEMIEFest Poster: Computational Thinking for All Children



1

Adults can help children develop their engineering thinking by asking questions and supporting them in interacting with materials (Lippard et al., 2017).

2

Children engage in engineering learning while playing with blocks (Gold & Elicker, 2020).

3

Children display higher order thinking during engineering learning (Lippard et al., 2019).

YOUNG CHILDREN ENGAGE IN ENGINEERING DURING EVERYDAY PLAY. ENGINEERING INVOLVES SOLVING PROBLEMS THROUGH ASKING QUESTIONS, EXPLORING MATERIALS, CREATING SOLUTIONS, AND IMPROVING THESE SOLUTIONS.



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



[STEMIE Resource: A Guide to Asking Open-Ended Questions](#)



[STEM4EC Blog: Mythbuster Series #5](#)



[STEMIE's Discovery Play Activities With Your Young Child series](#)



[STEMIE Resource: A Guide to Adaptations](#)



[STEMIE's Storybook Conversations series](#)



- 1 Patterning, a non-numeracy math content can be predictor of later mathematics achievement (Rittle-Johnson et al., 2016).
- 2 During free play, toddlers show understanding of spatial skills and thinking (Uhlenberg & Geiken, 2020).
- 3 Preschool children are capable of engaging in geometrical thinking (Oughton et al., 2022).

MATH IS FAR MORE THAN JUST ADDING AND SUBTRACTING OR COUNTING. MATH INCLUDES GEOMETRY, SPATIAL REASONING, MEASUREMENT, AND PATTERNING.



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



STEMIE's Daily Routine Explorations With Your Young Child series



STEMIE's Storybook Conversations series



Learning & Teaching with Learning Trajectories



STEMIE's Discovery Play Activities With Your Young Child series



STEMIE PD Series: What Counts in Teaching & Learning for ALL Young Children? – Learning Trajectories for Young Children



- 1 The interaction between parents and their children (e.g., math talk) provides children with opportunities to engage in math learning in a naturalistic context, such as mealtimes, (Susperreguy & Davis-Kean, 2016).
- 2 Natural outdoor environment provides an ideal setting for children to learn about science by asking questions and investigating the surrounding (Skalstad & Munkenye, 2021).
- 3 Loose parts can be used to support students' engagement in STEM learning experiences (Carla et al., 2022).

STEM LEARNING OPPORTUNITIES AND EXPERIENCES ARE EVERYWHERE, AND MOST OFTEN ARE COMPLETELY FREE OF CHARGE. ADULT-CHILD INTERACTIONS, NOT TOYS, ARE CRITICAL IN SUPPORTING CHILDREN'S DEVELOPMENT ACROSS ALL DOMAINS OF LEARNING.



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



[STEMIE Resource: A Guide to Asking Open-Ended Questions](#)



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[STEM4EC Blogs](#)



[STEMIE PD Series](#)



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1

Play, exploration, and daily activities provide toddlers with opportunities to learn STEM concepts (e.g., problem solving, number, counting; Reikerås et al., 2012).

2

Infants and toddlers have opportunities to build math skills when families use early math and number talk within daily routines and activities (Leech et al., 2021).

3

During free play, toddlers show understanding of spatial skills and thinking (Uhlenberg & Geiken, 2020).

INFANTS AND TODDLERS ARE NATURAL EXPLORERS. DURING THE FIRST TWO YEARS OF LIFE, THEY LEARN AND DEVELOP FUNDAMENTAL STEM SKILLS (E.G., CRITICAL THINKING, PROBLEM-SOLVING, MAKING PREDICTIONS) THROUGH EXPLORING AND INTERACTING WITH PEOPLE AND OBJECTS IN THEIR ENVIRONMENT



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



STEMIE's Daily Routine Explorations With Your Young Child series



STEMIE PD Series: Adaptations for Everyday Routines & Activities: Making STEM Happen for Infants & Toddlers



STEM4EC Blog: Cause and Effect Through the Lens of Children 0-2 with Disabilities



STEM4EC Blog: Enhance STEM Learning and Participation for Young Children with Disabilities: Common Q&A for families



1 By providing equitable opportunities, all children, regardless of ability, race, ethnicity, language, and cultural background, will be able to participate in STEM (Clements et al., 2021).

2 When a culture of high expectations is established for STEM learning, all students seem to have positive beliefs about their ability to do STEM (Murphy, 2020).

3 Children can engage in and learn algorithmic thinking skills regardless of gender (Kanaki & Kalogiannakis, 2022).

GIRLS HAVE THE INTEREST AND CAPABILITY TO DO WELL IN ANY OF THE STEM DOMAINS (E.G., SCIENCE, TECHNOLOGY, ENGINEERING, MATH).



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



Follow the child's lead and interests.



Extend the child's STEM learning experiences and ask questions



STEMIE Resource: [A Guide to Asking Open-Ended Questions](#)



[STEMIE's Curated Book Lists about Women in STEM Innovators](#)



[STEMIE's Daily Routine Explorations With Your Young Child](#) series



1

With adults' support and scaffold (e.g., embedding STEM talk into storybook reading), children can engage in STEM understanding and thinking (David e al., 2021; Leech et al., 2020).

2

Infusing STEM language into daily routines and activities can promote ALL children's STEM skills (Berkowitz et al., 2015; Mendelsohn et al., 2022).

3

STEM and literacy are vital and equally fundamental for children's academic and career success (Yang et al., 2021).

ALL ASPECTS OF CHILDREN'S DEVELOPMENT ARE EQUALLY IMPORTANT AND INTERTWINED. IN FACT, STEM, LANGUAGE, AND LITERACY CAN GO HAND IN HAND.



WHAT CAN I DO TO CULTIVATE STEM EXPERIENCES FOR ALL?



STEMIE's [A Guide to Dialogic Reading](#)



STEM4EC Blog: [Mythbuster #2](#)



STEMIE Resource: [A Guide to Asking Open-Ended Questions](#)



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