

STEM Meets EI Series: What Does STEM Have to Do With Me?

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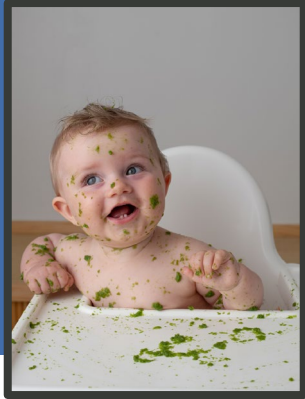
August 20, 2025



Disclosures & Acknowledgements

- This content was developed under a Cooperative Agreement between the U.S. Department of Education (DOE), Office of Special Education Programs (OSEP) and the FPG Child Development Institute at University of North Carolina at Chapel Hill (#H327G230002) in partnership with the Marsico Institute for Early Learning at the Denver University.
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- Presenters declare no conflicts of interest.





Session 1

STEM
Around the
House



Session 2

Brilliance of
Babies'
Thinking



Session 3

Brilliant
Babies in
Action



Session 4

What Does
STEM have
to Do with
Me?



STEM Meets EI: Series Recap



Today's Big Idea

- Explore how early STEM learning opportunities support developmental outcomes, reflect family-centered values, and promote equity in early learning.

Objectives

- Discuss how STEM learning experiences naturally align with early intervention goals across developmental domains,
- Describe benefits to children and families when EI providers identify and support STEM learning opportunities within early intervention settings.
- Identify three resources to support STEM teaching and learning practices within early intervention settings.





Meet Josh:

A lover of baths.

Vignette: Josh's Bathtime Investigation

Josh is 2 years old and receives early intervention services for delayed expressive language and mild motor delays. During a recent home visit, Josh's therapist joins him and his mom for bath time. Josh is very interested in scooping and pouring water between different cups, watching closely as the bubbles rise and overflow. He also likes to repeatedly dunk his toy duck, then lets it go, giggling as it bobs back to the surface. As she observes him, Josh's mom chuckles, "He could scoop and splash all day if I let him. I'm not sure what he's learning, but he's definitely into it."

Instead of redirecting, Josh's therapist leans in. She starts asking questions like "Which cup holds more water?" and introduces simple words like "full," "empty," "sink," and "float." She models slow and gentle pouring and compares the size of the bubbles that pop up in the water.

Vignette: Josh's Bathtime Investigation

With some encouragement from his therapist, Josh's mom joins in, adding some sponges and plastic containers to the mix. She talks about what she is doing with these new materials. What Josh's mom doesn't realize is that her language is closely tied to STEM vocabulary and that her rich descriptions are helping Josh make additional meaning from this fun (and scientific!) experience.

By the end of the session, Josh begins to explore some of these new actions, imitating some new words and simple phrases as he plays. He even adds his own spin to this investigation, filling up a nearby cup with water and then watching to see if it floats or sinks.

This wasn't a structured lesson. It was a bath. But it was also STEM!



This wasn't a structured lesson.

It was a bath.

But it was also **STEM**.

What does STEM look like in 0-3?





Ok, but I'm an EI Provider...

What does STEM have to do with me?

**Thinking inspires
development across
domains.**



STEM Supports Developmental Outcomes

- **NOW:** Early STEM learning supports cognitive, language, and social-emotional development, and fosters early problem-solving and critical thinking skills.
- **LATER:** Engaging in early STEM learning activities raises later literacy and math scores.

(e.g., Aldemir & Kermani, 2017; Yang, Campbell, Lim, 2023)



**STEM learning opportunities
support the very outcomes early
intervention aims to foster through
IFSP goals.**



STEM Reflects the Family-Centered Values of EI

- Easily embedded in daily routines
- Builds on the child's interests
- Empowers caregivers as facilitators of learning
- Is culturally responsive
- Builds on child and family strengths

(e.g., see Aldemir & Kermani, 2017; Amsbary et al., 2023; Tippet & Milford, 2017; Yang, Campbell, Lim, 2023)



STEM is not a "program" to deliver—it's a lens for deepening parent-child interactions that are already happening.



STEM Activities Promote Equity in Early Learning

- Narrows the opportunity gap
- Supports inclusive participation
- Does not require special toys or materials
- For parents – Does not require expertise in STEM domains
- For kids – Does not require “readiness” in child

(e.g., Aldemir & Kermani, 2017; Yang, Campbell, Lim, 2023)



Making STEM learning opportunities accessible early in children's lives promotes to better academic access and outcomes.





I'm in! Now what?

Add to what you already do!

A Framework for STEM in EI

1

Use or Create

Naturally occurring learning opportunities

2

Embed

STEM **foundational** learning concepts

3

Adapt

The environment, materials, and instruction.

From - Campbell & Harradine_3/30/2021_STEMIE Infant Toddler Webinar

Adapting for STEM

- Start with the **child 's interests and preferences**
- Adapt **routines** and **activities** for:
 - STEM domains/**thinking** skills
 - Child's **strengths in various developmental areas**
- **Access needs**



STEMIE's Approach to Adapting Opportunities

Environment, Activities, And Routines



For example: Room set-up, equipment, how an activity is done, length of time

01

STEP

Materials



For example: Modifications to toys, materials, assistive technology devices

02

STEP

Instruction



For example: Adding information, reducing steps

03

STEP

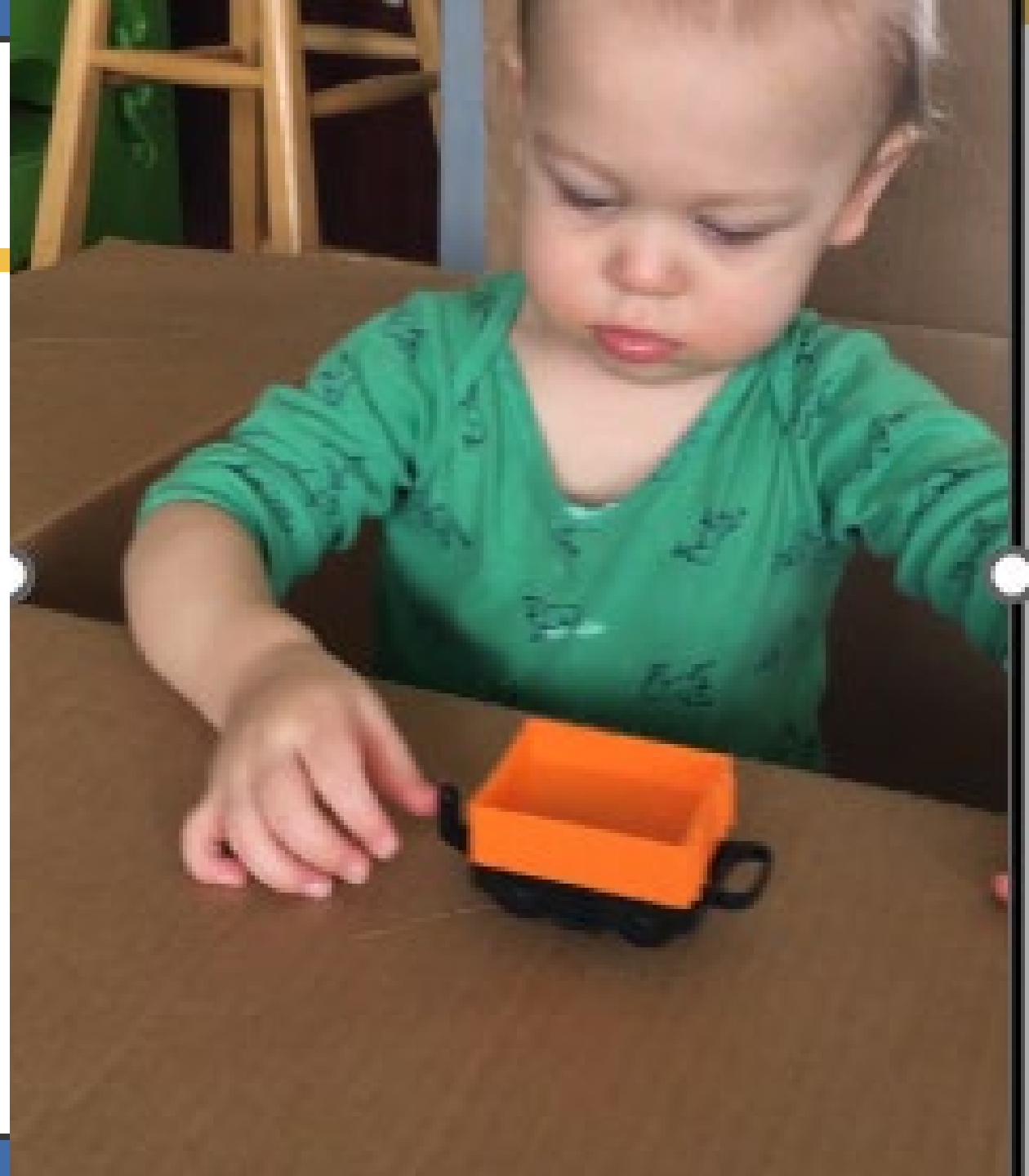
Adaptation (& STEM) in Action with Babies



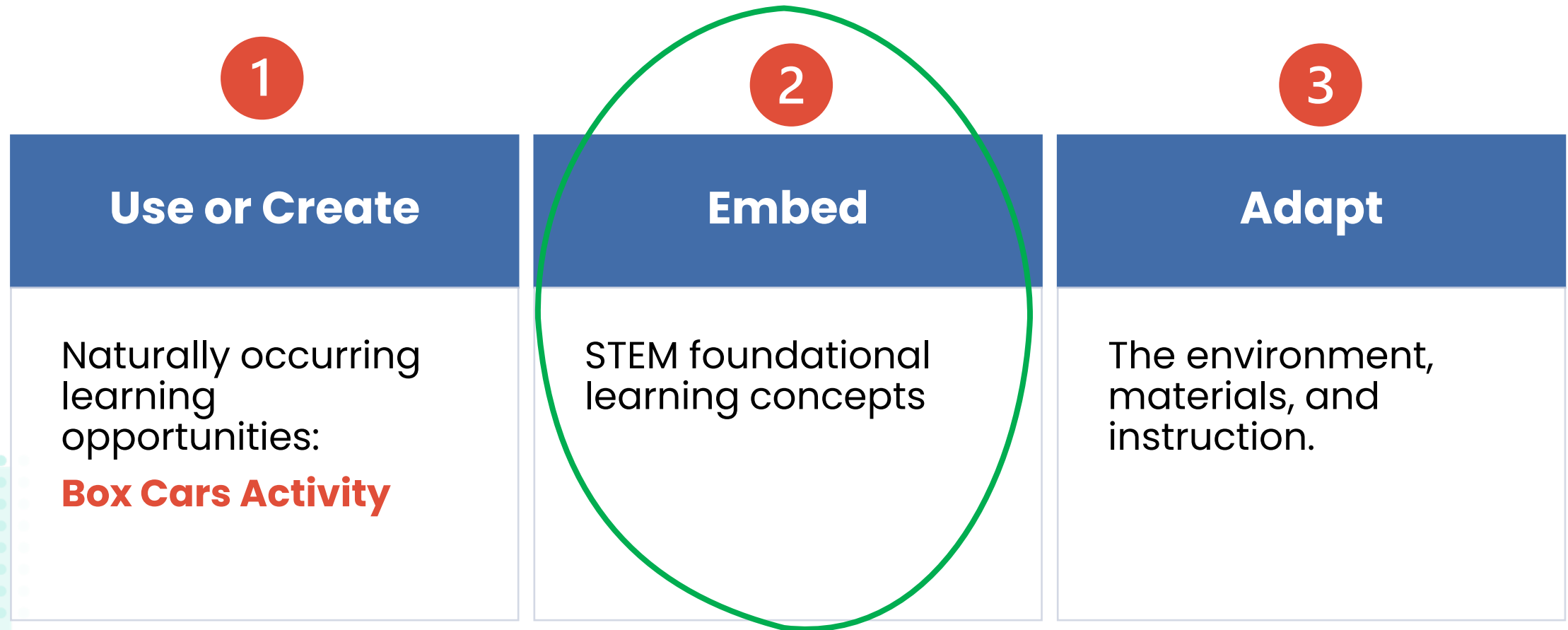
SOURCE: Idaho STEM Action Center(YouTube)

IFSP Outcome: Gross Motor

Aaron will move from a crouching position to standing and use standing and cruising skills to move between pieces of furniture or other stable supports so that he can participate more independently in play and family activities (e.g., reaching toys, joining in songs, or helping with simple clean-up).



A Framework for STEM in EI



From - Campbell & Harradine_3/30/2021_STEMIE Infant Toddler Webinar

Physical Science: Forces & Motion

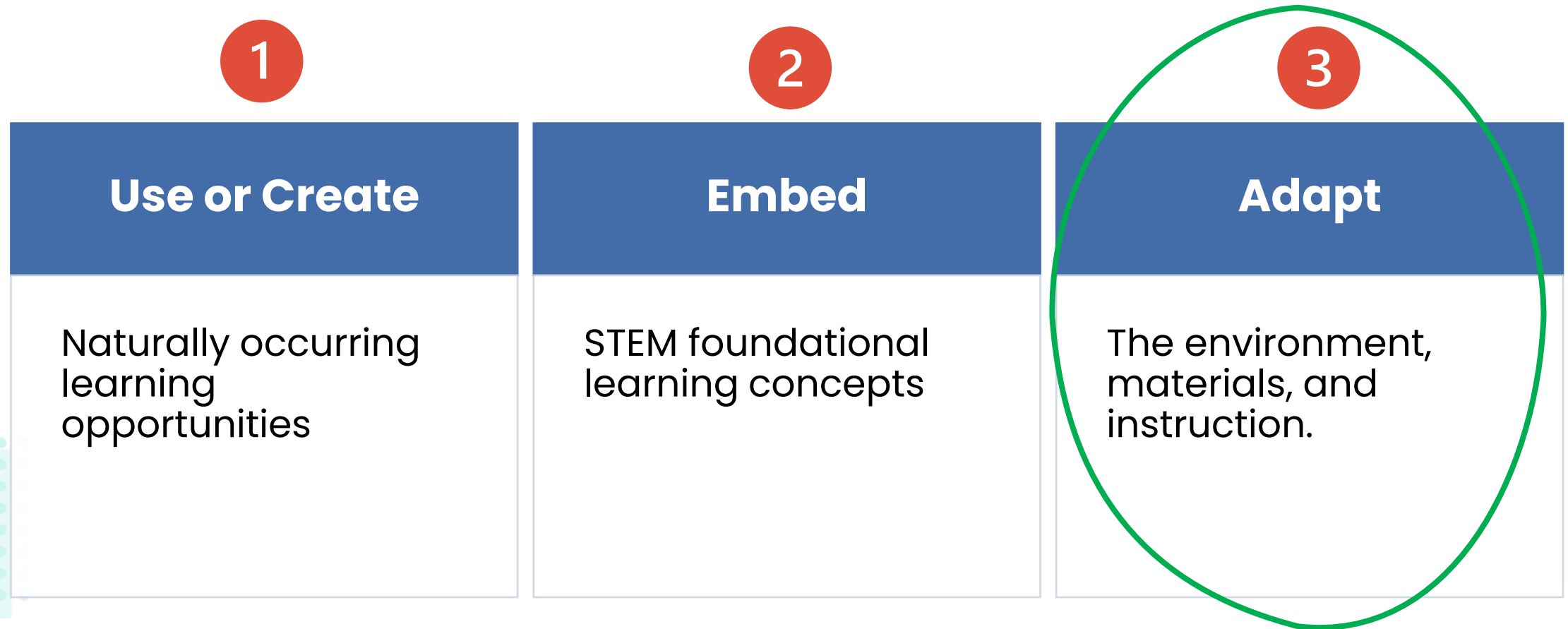
STEM Concepts:

- Motion
- Force
- Gravity
- Friction
- Collision

Foundational Levels:

- Observer- Noticer
- Observer – Recognizer
- Acter-On
- Identifier

A Framework for STEM in EI



From - Campbell & Harradine_3/30/2021_STEMIE Infant Toddler Webinar

Adapt for STEM

What do you notice?

- **Child** (interest, thinking,)
- **Environment**
- **Materials**
- **Instruction**
- **STEM concepts**

What would you add?



STEMIE Resources

El Cards

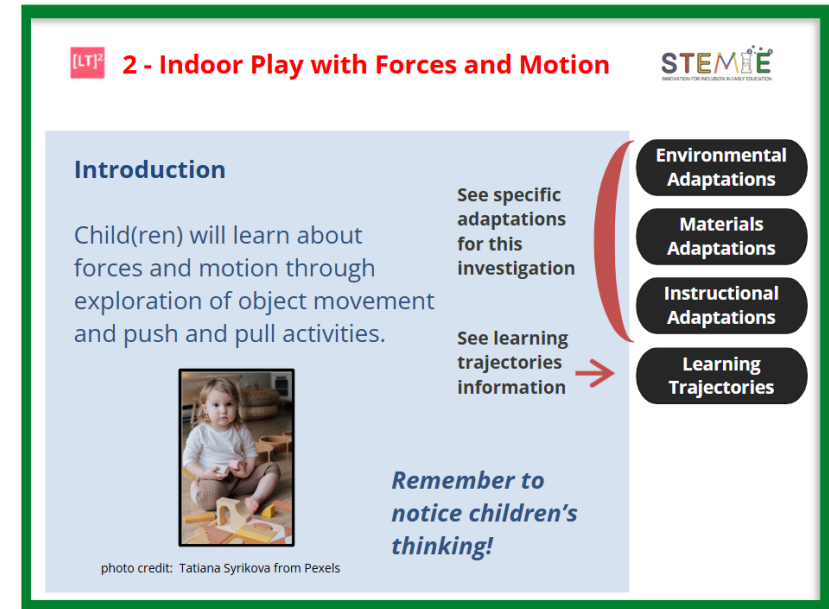
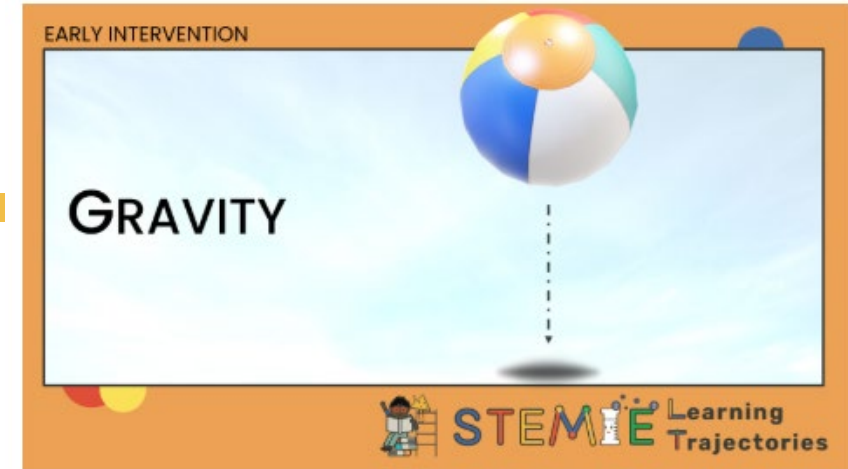
One page STEM activity cards for EI providers (spontaneous/the “use” vs. “create”

[Explore El Cards for various routines](#)

Investigations

Outline activities that align with a particular STEM learning trajectory (LT, planned, “create”)

[Explore LT Resources: Foundational Investigations](#)



IFSP Outcome: Play

Aaron will engage in simple constructive play—such as stacking, connecting, or placing objects together and taking them apart—during play with caregivers so that he can explore, problem-solve, and take a more active role in shared activities.



Adapt for STEM

What do you notice?

- **Child** (interest, thinking,)
- **Environment**
- **Materials**
- **Instruction**
- **STEM concepts**

What would you add?



Foundational Engineering

Engineering for children in the early years is about exploring materials and building knowledge about them so that they can be used to solve problems and/or create something .

STEM Concepts in this domain:

- Investigation
- Design
- Evaluation

Explore Resources for Foundational Engineering



Adapt for STEM (& Access)

What do you notice?

- **Child** (interest, thinking,)
- **Environment**
- **Materials**
- **Instruction**
- **STEM concepts**

What would you add?





A GUIDE TO...

ADAPTATIONS

Every child is different, and these are only suggested adaptations. Do what works best for the child. The child's therapist can give you more ideas.

Are you interested in helping your child learn about STEM? Are you looking for ways to help your child participate in STEM?

Use this guide to adapt activities for your child. Every child is different, and these are only suggestions. Do what works best for your young child or children you are working with. You might also work with the child's speech or occupational therapist to adapt activities.



INCLUSION FRAMEWORK

The inclusion framework is informed by evidence-based inclusive practices (e.g., Milbourne & Campbell, 2007; DEC, 2014) and helps adults support all children in STEM.

ADAPTATIONS FRAMEWORK

Adaptations to the environment and materials align with the Division for Early Childhood (DEC) Recommended Practices on environment while instructional adaptations align with the Recommended Practices on instruction.

1. **ENVIRONMENT** - Environmental, activity, and/or routine adaptations are broad changes and/or accommodations in the setting and/or activity that support learning for all children (e.g., room set-up, equipment, how an activity is done, length of time).



Follow your child's lead and interests. Enthusiastically ask your child questions about what they are doing and what they like.



Answer your child's questions. If you do not know the answer, work together with your child to discover the answer.



Encourage your child to participate in the activity as much as possible. Praise your child's efforts and successes.

STEMIE

- ▶ General Teaching Practices
- ▶ Descriptive Talking/Verbal Guidance
- ▶ Modeling
- ▶ Prompting

- ▶ Reinforcement
- ▶ Scaffolding
- ▶ Wait Time



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Answer your child's questions. If you do not know the answer, work together with your child to discover the answer.



Encourage your child to participate in the activity as much as possible. Praise your child's efforts and successes.

STEMIE

Cultivate and encourage ALL young children (0-5; with and without disabilities) to explore STEM concepts through activities as independently as possible with adaptations in their natural environments.



A GUIDE TO...

DIALOGIC READING

Are you spending more time at home reading with your young child? Are you interested in helping your child's language skills and learn?

Cultivate and encourage ALL young children (0-5; with and without disabilities) to explore STEM concepts through activities as independently as possible with adaptations in their natural environments.

PRACTICES

Use these suggested adaptations. Do what works best for your child.



PRACTICES

Use these suggested adaptations. Do what works best for your child. (e.g., family members, friends to help support children's learning in activities, keeps their interest, I think about STEM when using more information) is not enough.

Use these suggested adaptations. Do what works best for your child. Use these suggested adaptations so you can engage in STEM learning.

Cultivate and encourage ALL young children (0-5; with and without disabilities) to explore STEM concepts through activities as independently as possible with adaptations in their natural environments.



STEP ONE

Choose a book. Look up your child's interests to give your child a choice. Read the book together.

Ask questions. Ask your child questions about the story. Ask your child to describe the story.

Use books. Use books to teach your child about the world. Use books to teach your child about the alphabet.

Use handouts. Use handouts to teach your child about the world. Use handouts to teach your child about the alphabet.

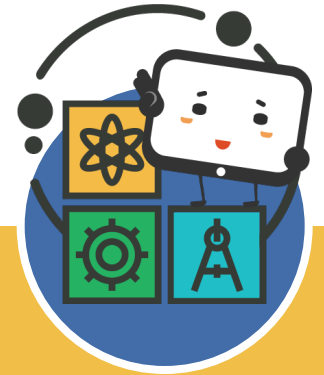
The Very Hungry Caterpillar is a book written and illustrated by Eric Carle.



Follow the caterpillar as they count and eat their way through the days of the week. Which of the caterpillar's meals is your child's favorite?



STEMIE



A Guide to...



More Resources to Explore

Action Plan Templates

STEM-ify Daily Activities

Turn your daily activities into STEM learning opportunities (fillable form + sample).

[Explore this resource](#)

Planning for STEM Experiences

Use this fillable form to create a STEM experience with a family and or teacher working with a young child. (framework + fillable form).

[Explore this resource](#)

STEMify-ing Your Daily Activities



Activity (Follow your child's interests):

Blowing bubbles

Where's the STEM?

Shapes, air

Strategy

What You'll Try

STEM talk

The bubbles are spheres, just like your favorite ball.

Open-ended Questions

What else is a sphere? (prompt: eyeballs, round fruits, marbles)

Reading

book about bubbles. (Pop! By Jason Carter)

Others

Explore what happens if use different widths of straws or bubble wands to see how bubbles change

Adaptations (Environment, Materials, Instruction):

Plenty of space, change of clothes handy, towel handy, grabber to help hold bubble wand, plastic glove, model how to make bubbles, break down steps into small steps

- Daily Routine Explorations
- Discovery Play Activities
- EI Cards
- Investigations
- Storybook Conversations



ON A WALK

DAILY ROUTINE EXPLORATIONS WITH YOUR YOUNG CHILD

Every child is different, and these are only suggested adaptations and activities. Do what works best for encouraging your child's independent exploration during this daily routine. Consult your pediatrician, physical therapist (PT), and/or occupational therapist (OT) first.

PATTERNS IN NATURE

DISCOVERY PLAY ACTIVITIES

Every child is different, and these are only suggested adaptations and activities. Do what works best for encouraging your child's independent exploration during this daily routine. Consult your pediatrician, physical therapist (PT), and/or occupational therapist (OT) first.

IDENTIFYING MOTION

EARLY INTERVENTION WITH YOUR YOUNG CHILD

Every child is different, and these are only suggested adaptations and activities. Do what works best for encouraging your child's independent exploration during this daily routine. Consult your pediatrician, physical therapist (PT), and/or occupational therapist (OT) first.

WORM WEATHER

STORYBOOK CONVERSATIONS WITH YOUR YOUNG CHILD

Every child is different, and these are only suggested adaptations and activities. Do what works best for encouraging your child's exploration during this literacy activity. Consult your pediatrician, physical therapist (PT), and/or occupational therapist (OT) first.

Did you know reading books is a great opportunity to support STEM learning?

Worm Weather is a book written by Jean Taft and illustrated by Matt Hunt.

Worm Weather uses simple rhyming words and colorful pictures to talk about the sounds and sights before, during, and after a thunderstorm.

- If you do not have a paper copy of this book, watch a YouTube video of someone reading the book. If you prefer to read it to your child yourself, just mute the audio.
https://www.youtube.com/watch?v=PqQVWqX_Dak
- This book is accessible for individuals with reading disabilities through [Bookshare](#).
- Check your local library to see if it allows you to borrow a digital version of this book to read on a laptop, tablet, or phone.



STORYBOOK CONVERSATIONS WITH YOUR YOUNG CHILD

Black Innovators

Every child is different, and these are only suggested age ranges and books. Do what works best for encouraging the child's independent exploration of STEM concepts.



A Computer Called Katherine
Suzanne Slade
Preschoolers
Math, STEM Innovator
Also available in Spanish



Abby Invents Foldibot
Dr. Arlyne Simon
Preschoolers
Engineering
Black author & characters



Abby Invents Unbreakable Crayons
Dr. Arlyne Simon
Preschoolers
Engineering
Black author & character



Ada Twist, Scientist
Andrea Beaty
Kindergarteners
STEM
Black character
Also available in Spanish



Baby Botanist
Dr. Laura Gehl
Toddlers
Science
Black character



Cassidy and the Mixed Up Numbers
Debi Shepperd
Preschoolers
Math
Black author, Black disability character



STORYBOOK CONVERSATIONS WITH YOUR YOUNG CHILD

CURATED STEM BOOKLIST

BABIES & TODDLERS (0 - 2+ YEARS)



Architecture for Babies
Jonathan Litton
Engineering



Baby Code!
Sandra Horning
Technology (CT)



Baby Loves Gravity!
Ruth Spiro
Science
Black character
Also available in Spanish



Baby Loves Structural Engineering!
Ruth Spiro
Engineering



Bear in a Square
Stella Blackstone
Math
Also available in Spanish & French



Bear Shadow
Frank Asch
Science



Circle! Sphere!
Grace Lin
Math
Asian author
Also available in Spanish



Counting Kisses
Karen Katz
Math
Also available in Spanish



Crash! Boom! A Math Tale
Robie H. Harris
Math



Hello, World! Weather
Jill McDonald
Science

STEMIE

STORYBOOK CONVERSATIONS WITH YOUR YOUNG CHILD

Disability in STEM

Every child is different, and these are only suggested age ranges and books. Do what works best for encouraging the child's independent exploration of STEM concepts.



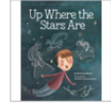
Little People Big Dreams
Angela Johnson
Preschoolers
Math
Black author



Stay Curious!
Kathleen Krull & Paul Brewer
Preschoolers
STEM Innovator
Also available in Spanish & Chinese



The Girl Who Thought in Pictures
Julia Finley Mosca & Daniel Rieley
Kindergarteners
Science & Engineering, STEM Innovator



Up Where the Stars Are
Ryan Jacobson
Preschoolers
Science
Disability character

These resources were developed under a Cooperative Agreement between the U.S. Department of Education's Special Education Programs (OSEP) and the University of North Carolina at Chapel Hill. The contents do not necessarily represent the policy of the U.S. Department of Education, nor does mention of trade names or commercial products constitute endorsement or recommendation by the Federal Government.



Curated Booklists



Open captions are embedded in the video.



App Store



Google Play



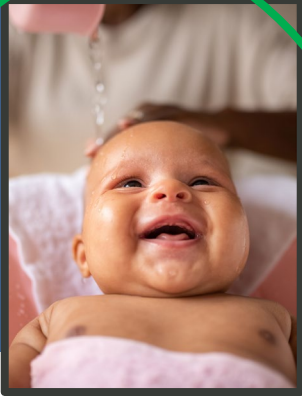
My STEM Adventure App

Early STEM Learning Opportunities...

- Build foundational skills across developmental domains
- Honor and strengthen caregiver-child relationships
- Act as a lever for academic inclusion, opportunity, and outcomes
- Fit within (and enhance) your EI aims



Big Ideas to Take Away



Session 5

Become a
STEMcaster



Session 6

Parents as
STEM
Teachers



Session 7

STEM at
Childcare



STEM Meets EI: Still to Come!



stemie.fpg.unc.edu



stemie@unc.edu



stemielearningtrajectories.fpg.unc.edu



youtube.com/@stemiiee



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Monthly newsletter! Sign up at
<https://stemie.fpg.unc.edu/news-items/subscribe-to-our-newsletter/>



instagram.com/stemie4all



Stay Connected to STEMIE

STEMIE

INNOVATION FOR INCLUSION IN EARLY EDUCATION

-
- A young girl with dark hair is looking through the eyepiece of a toy microscope. She is wearing a white lace-trimmed shirt. The image is in black and white with a blue tint.

