STEM in Early Intervention 101: Must-Have Toolkit Essentials

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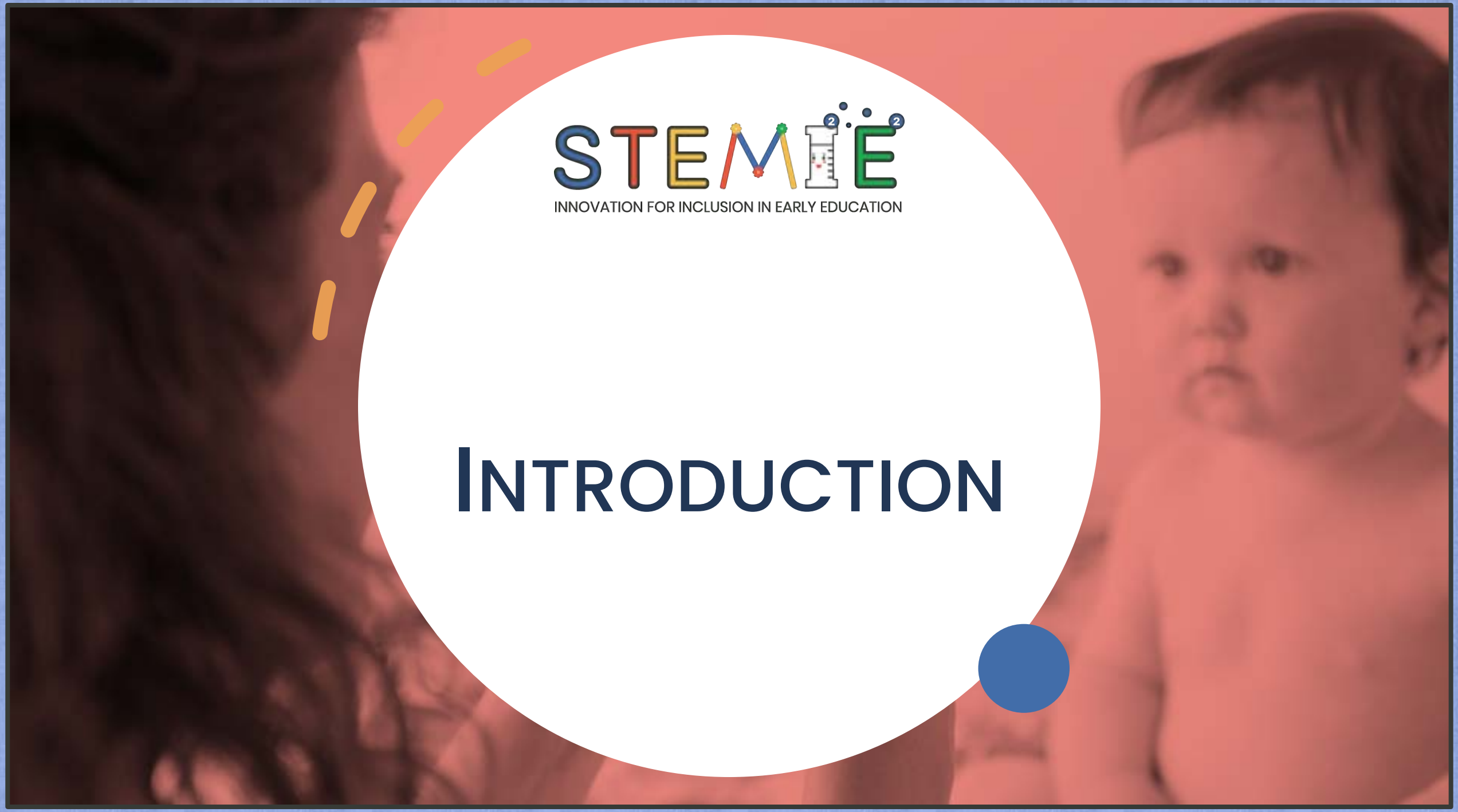
UNC FRANK PORTER GRAHAM CHILD DEVELOPMENT INSTITUTE
Morgridge College of Education
Marsico Institute FOR EARLY LEARNING
IDEAs that Work



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INTRODUCTION

"All children have the right to equitable learning opportunities that enable them to achieve their full potential as engaged learners and valued members of society".

~NAEYC Advancing Equity in Early Childhood Education

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Developmentally Appropriate Practice

"Methods that promote each child's optimal development and learning through a strengths-based, play-based approach to joyful, engaged learning."

https://www.naeyc.org/resources/position-statements/dap/definition

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Agenda & Learning Objectives

- Early STEM in Infants and Toddlers
- Incorporating IFSP in early STEM
- Tools and Resources

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STEM EXPERIENCES FOR INFANTS AND TODDLERS

STEM Opportunities Can Be Incorporated into Everyday Routines and Activities

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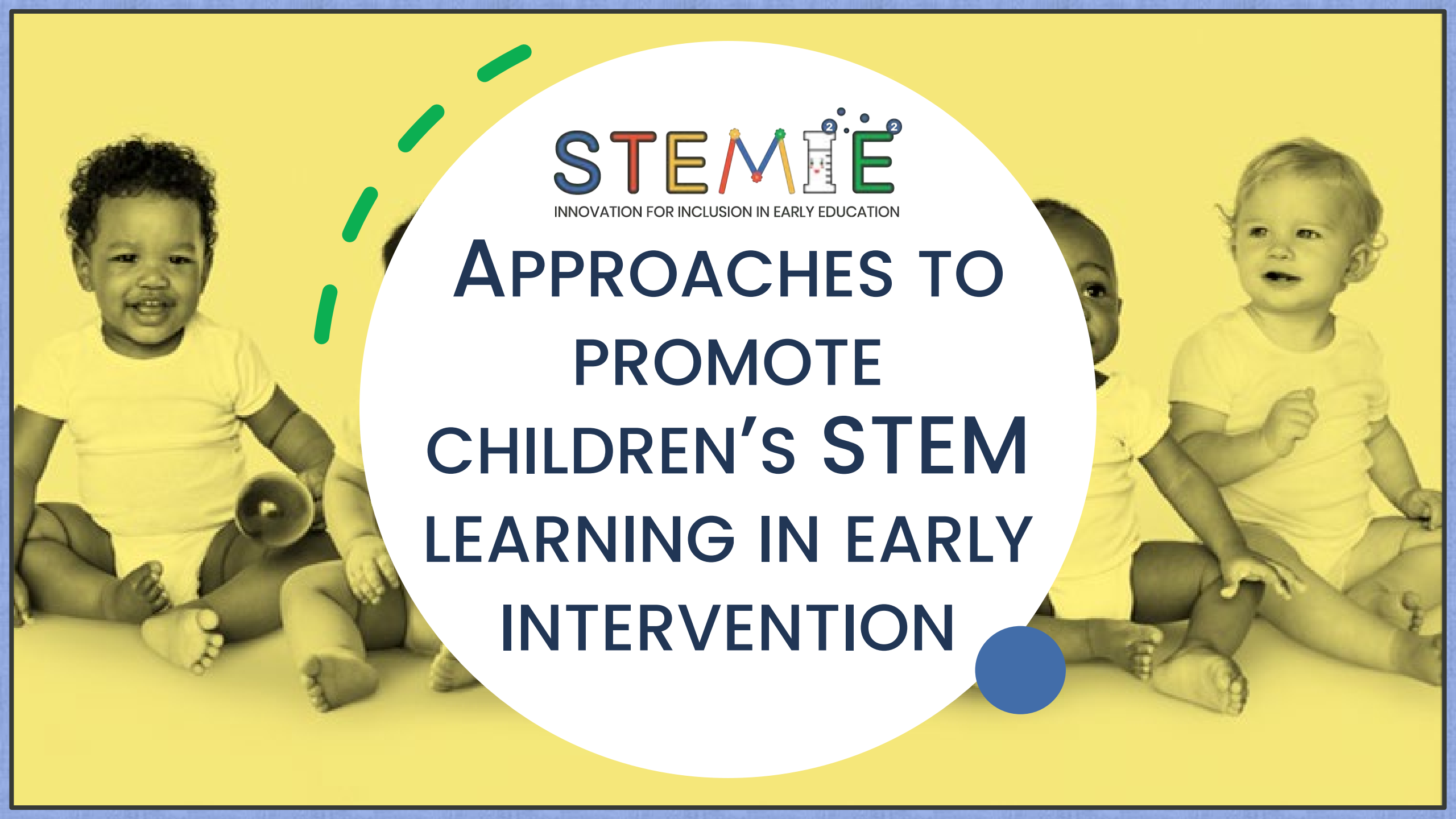
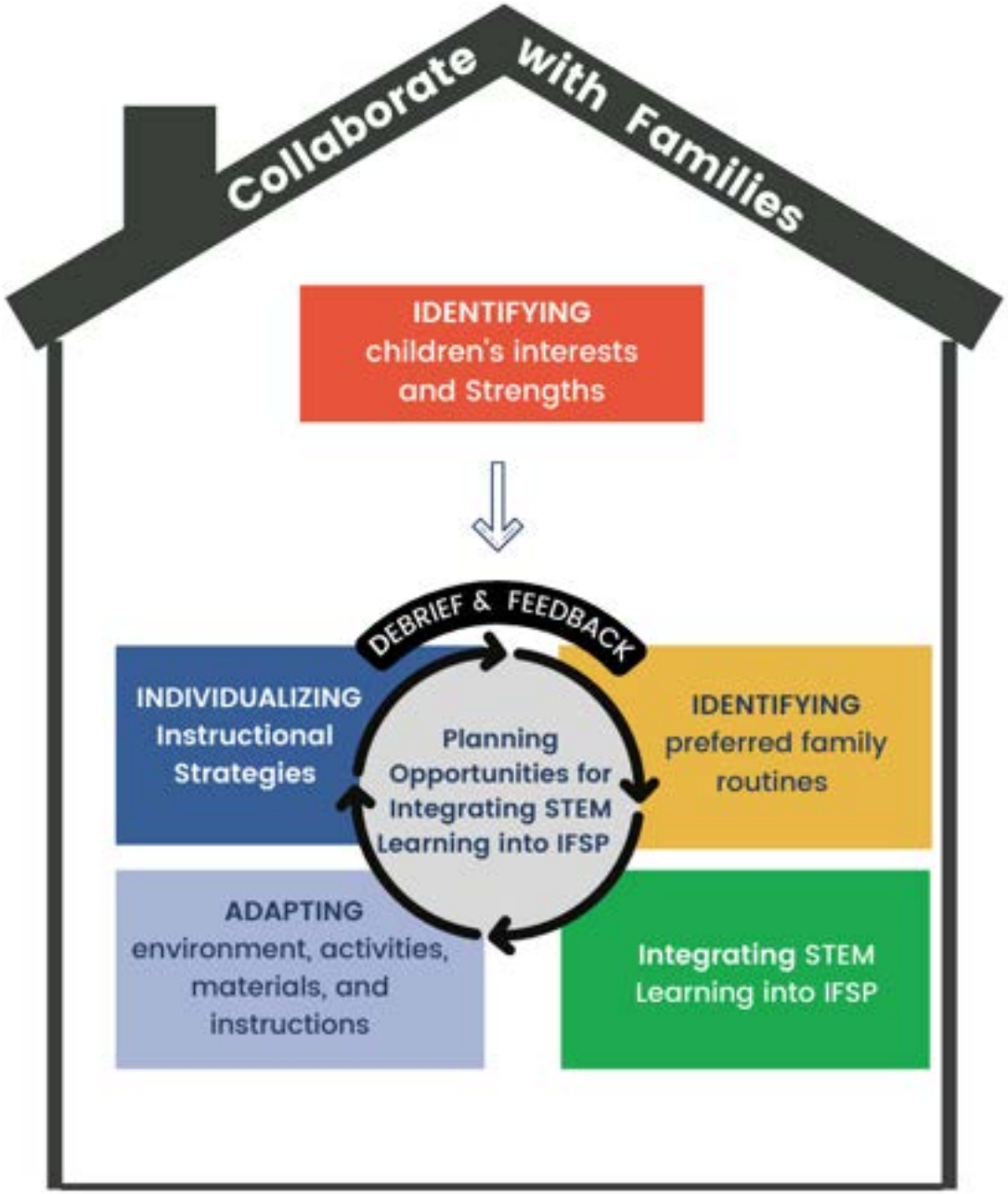
APPROACHES TO PROMOTE CHILDREN'S STEM LEARNING IN EARLY INTERVENTION



Collaborate with Families

- Children's interests
- Use STEM vocabulary or Open-ended questions
- Learning trajectories approach
- Inclusion framework: *Environment, Materials, Instruction*



START WITH THE CHILD

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What are their interests?

How do we know? How can we understand children's interests and development?

- Observe carefully
- Really pay attention to what kids do, say, communicate in all ways
- New lens!

Strengths-based!

It's about what children CAN do

Noticing HOW children are thinking is more critical and helpful than knowing if they got the 'right' answers.

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Using child's interests and strengths to build STEM skills

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- **Scan QR code with Smartphone camera or**
- **Connect to an accessible digital version: https://stemie.fpg.unc.edu/sites/stemie.fpg.unc.edu/files/All%20About%20ME.pdf**

Learning trajectories approach

- Start with children’s thinking!
- Children's thinking follows a path or developmental progression
- Foundational levels to more and more sophisticated ways of thinking as the path moves ahead

Learning Trajectories Approach

Goal

Where are you hoping to go?
The goal is grounded in content knowledge of the topic (science, technology, engineering, or math).

Developmental Progression

Where are you now?
Children learn each successive level of thinking in the developmental progression. Children move through the progression via intentional teaching designed to building understanding.

Instruction/Teaching

How do you get there?
Adult practices used to individualize STEM activities within the daily routine and environment. Instructional tasks include the environment (temporal, physical, social), adult-child and peer interactions, and activities or experiences.

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Force and motion LTs

Closed captions are available once you start the video. Select the ‘cc’ button in the bottom menu bar.

Source: STEMIE Incubator site

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Force and Motion: Motion Identification

Progression Steps	Description
Motion Noticer	Notices the motion of objects
Motion Recognizer	Understands what is and is not moving
Motion Distinguisher	Distinguishes different types of movement, with an intuitive understanding that this is related to the properties of an object (for example., round things roll)
Motion Type Recognizer	Understands that objects move differently but may identify the motion incorrectly
Motion Type Identifier	Correctly identifies types of object movement when they see it.
Motion Predictor	Correctly predicts what type of movement a particular object will have based on its shape
Impact on Motion Identifier	Identifies/describes the attribute (shape) that leads to particular types of movement

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What to Add in About STEM

- Opportunities to **"Notice"**
- STEM **vocabulary** related to routine
- Words describing **characteristics/attributes** of objects/situations that are present
- Words relating to **STEM (Science, Technology, Engineering, Math) concepts** that are possible within the routine
- Open-ended questions

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Inclusion at STEMIE

Environment, Activities, And Routines

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

01 STEP

02 STEP

Materials

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

03 STEP

Instruction

For example: Adding information, reducing steps

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Action Plan and Reflection

STEMIE's Action Plan & Reflection is for EI Provider to use during home visits. There's place for child's name and date. There are 6 sections:

1. Opportunities for target goal/outcome
2. STEM learning opportunities checklist of possible STEM topics
3. Home-based routines check list
4. STEM experience plan where you bring steps 1-3 together
5. Determine coaching strategies checklist
6. Reflections

- **Scan QR code with Smartphone camera or**
- **connect to an accessible digital version at https://stemie.fpg.unc.edu/sites/stemie.fpg.unc.edu/files/Action%20Plan%20%26%20Reflection%20for%20EI.pdf**

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SANDY'S EXPERIENCES

- How do you prepare to work with families on embedding STEM into the EI sessions?
- How do you communicate with families about the importance of embedding STEM in EI?
- In what ways has embedding STEM in EI with families had a positive impact on them?
- In what ways has embedding STEM in EI with families had a positive impact on you as an EI provider?

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EARLY INTERVENTION CARDS FOR FAMILIES

EI Cards – Noticing Groceries

EI cards are one page STEM activity cards for EI providers to collaborate with families to support children's learning goals in daily routines. Each EI card includes ideas and strategies adults can use to support children's STEM learning and other learning goals while doing everyday activities.

WHAT CAN I SAY?:

- Name (label) objects being put in cart (e.g., banana, strawberry), Label characteristics (e.g., color, shape, size, texture, smell, sounds)
- *"These strawberries are red. What color are the bananas? They are yellow."*
- *"I am going to drop this box or crackers into the cart. It is going to make a big sound."*
- *"Smell these berries. Very sweet."*

ACTIVITY DESCRIPTION:
Take your child grocery shopping. Talk about the characteristics of different groceries you are selecting. Show grocery items to your child that they may particularly like. Encourage your child to feel, smell, or perhaps taste the food item.

IDEAS TO SUPPORT MY CHILD'S GOAL:

STEM LEARNING AREA:
Physical Science (concepts related to objects/things, what they do, and how they move): Structure and Properties of Materials (understanding characteristics of things and how those characteristics impact what things do)

STEM PROGRESSION STEP:
Properties Observer: Observes attributes and characteristics of materials in the living and non-living world

Image credit: Microsoft Stock

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- **Scan QR code with Smartphone camera or connect to an accessible digital version at**
- **https://stemielearningtrajectories.fpg.unc.edu/wp-content/uploads/EI-Cards-Daily-Routines-Grocery-Shopping.pdf**

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Sandy's experiences – EI Cards

- How do you engage families in using the EI cards?

A Guide to Everyday STEM Talk

Use these quick everyday STEM talk tips to encourage your child to think about their learning and to develop their STEM knowledge.

- **Everyday STEM Talk: Getting Ready**
  - Instead of just getting dressed or having snack, consider exploring sequences during daily routines. ***'We have to put socks on before putting on our shoes.' 'First, we wash our hands, then we eat!'***

  - Instead of just getting dressed, consider asking your child what would come next if the pattern were to continue. ***'Your shirt has stripes! Purple, white, purple, white, what comes next?***

- **Scan QR code with Smartphone camera or connect to an accessible digital version at**

- **https://stemie.fpg.unc.edu/sites/stemie.fpg.unc.edu/files/A%20Guide%20to%20Everyday%20STEM%20Talk.pdf**

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Daily Routines Explorations

Cultivate young children's STEM knowledge during daily routines with these adaptations and question prompts.

https://stemie.fpg.unc.edu/daily-routine-explorations

DAILY ROUTINE EXPLORATIONS WITH YOUR YOUNG CHILD (0 – 12 MONTHS)

Mealtime for Infants

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.

Mealtimes are a great opportunity to support STEM learning. You can talk about STEM ideas and use STEM words as you feed or talk with your child as they start trying solid foods (right around 6 months).

Children can learn about ***quantity*** *("One more bite!")*, ***volume*** *("This cup has more milk.")*, ***sequencing*** *("First eat the banana, then a Cheerio.")*, ***physical properties*** *("It is too hot. My ice cream is melting!")*, and ***plants*** *("Carrots grow in the ground, but apples grow on trees.")*

Children learn new things when they practice them in everyday routines. Try one or two of the following activities during mealtimes. With a little bit of practice, mealtime can become a natural place to talk and learn about STEM. Use these ideas to set up the environment and materials to best suit your child's needs.

Key STEM Progression Steps:	Science	Computational Thinking	Engineering	Math

Note: STEM concepts are highlighted in ***bold and italicized.*** At the STEMIE center, technology refers to computational thinking.

Technology is the introduction of underlying concepts of building or creating technology, including computational thinking, which is the basic logic underlying computer science (U.S. Department of Ed/U.S. Department of Health and Human Services, 2016).

DAILY ROUTINE EXPLORATIONS WITH YOUR YOUNG CHILD (0 – 12 MONTHS)

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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.

Exploration:
Little Explorer

Key STEM Progression Steps

Science:
- **Properties Observer:** Observes attributes and characteristics of materials in the living and non-living world

Engineering:
- **Senses Investigator:** Investigates by demonstrating curiosity about the world around them through observations using any of their five senses. Shows foundational curiosity about the world around them, often without a specific goal.

Description: While feeding your child, talk about the **tastes, temperature, textures,** and **colors** of the food.
When introducing finger food to your child, provide different food and drink choices and encourage your child to explore new foods with **different senses** (e.g., smell, sight, sound, feel).

What My Child is Learning!

Children learn best by interacting with people and objects. Introduce STEM words, ask questions, and encourage them to explore various foods. Help your child make a connection between words and real-life experiences and develop fundamental critical thinking skills.

While feeding apple sauce, describe the tastes and textures *(sweet, smooth, soft, mushy)*.

Infants at this age are still learning how to say words but they may already have numerous ways to communicate! Watch for their cues as they may express their curiosity and interest by turning toward an object or pointing to something. Using open-ended questions offers an opportunity for children to explore an object that they are interested in.

While feeding apple sauce, your child is looking at the banana on the table and then looking back at you. You can say: Do you want a banana? Would you like to try it/touch it? *How does it feel like? Soft or hard?*

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Sandy's Advice

- What advice do you have for others when embedding STEM in EI?

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Thank You!

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