Parents as STEM Teachers

Hsiu-Wen Yang PhD

September 17, 2025

STEMIE INNOVATION FOR INCLUSION IN EARLY EDUCATION
UNC FRANK PORTER GRAHAM CHILD DEVELOPMENT INSTITUTE
Marsico Institute
IDEAs that Work


STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION
WILLKOMMEN
欢迎
स्वागत
BIENVENIDA
WELCOME
BIENVENUE
ようこそ
добро пожаловать
BEM-VINDO

Welcome

Housecleaning items

- The CEU is for live session participants who complete the evaluation.
- Once the series is finished in September, you will receive a request form about CEU.
- If you encounter any issues, please message Kellen Reid via the Zoom chat.
- The webinar will be recorded, and you can find the recording a week after the session. Additionally, you can find resources on the page.

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

Bonus session

- **STEM in Infant Toddler Child Care**
- Sep 24, 2025 01:00 PM

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

Reflect

- What did you notice?
- What did parents do?
- What STEM learning naturally occurred during this activity?

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

Learning objectives:

- Describe the role of parents as primary facilitators of STEM learning in everyday routines and interactions.
- Explore practical strategies that can be used to coach parents to create rich STEM learning experiences at home.

Agenda

- Parent's role in supporting STEM learning and children's learning goals at home
- Overview of Family Coaching Strategies
  - Step/tool/resources

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

How do you support families during EI sessions?

Role of Parents

- Share information and feeling
- Provide opportunities in everyday routines and activities
- Participate in joint planning and decision making
- Advocate and ask questions

Role of Providers

- Active Listening
- Coach parents to use strategies
- Empower parents
- Share information and resources
- Problem-solving
- Sharing leadership
- Reflection and feedback

One size does not fit all

- Tailored support, meet families where they are
  - Cultural considerations
  - A variety of entry points
  - Offer different tools for families to share the information

STEMIE

INNOVATION FOR INCLUSION IN EARLY EDUCATION

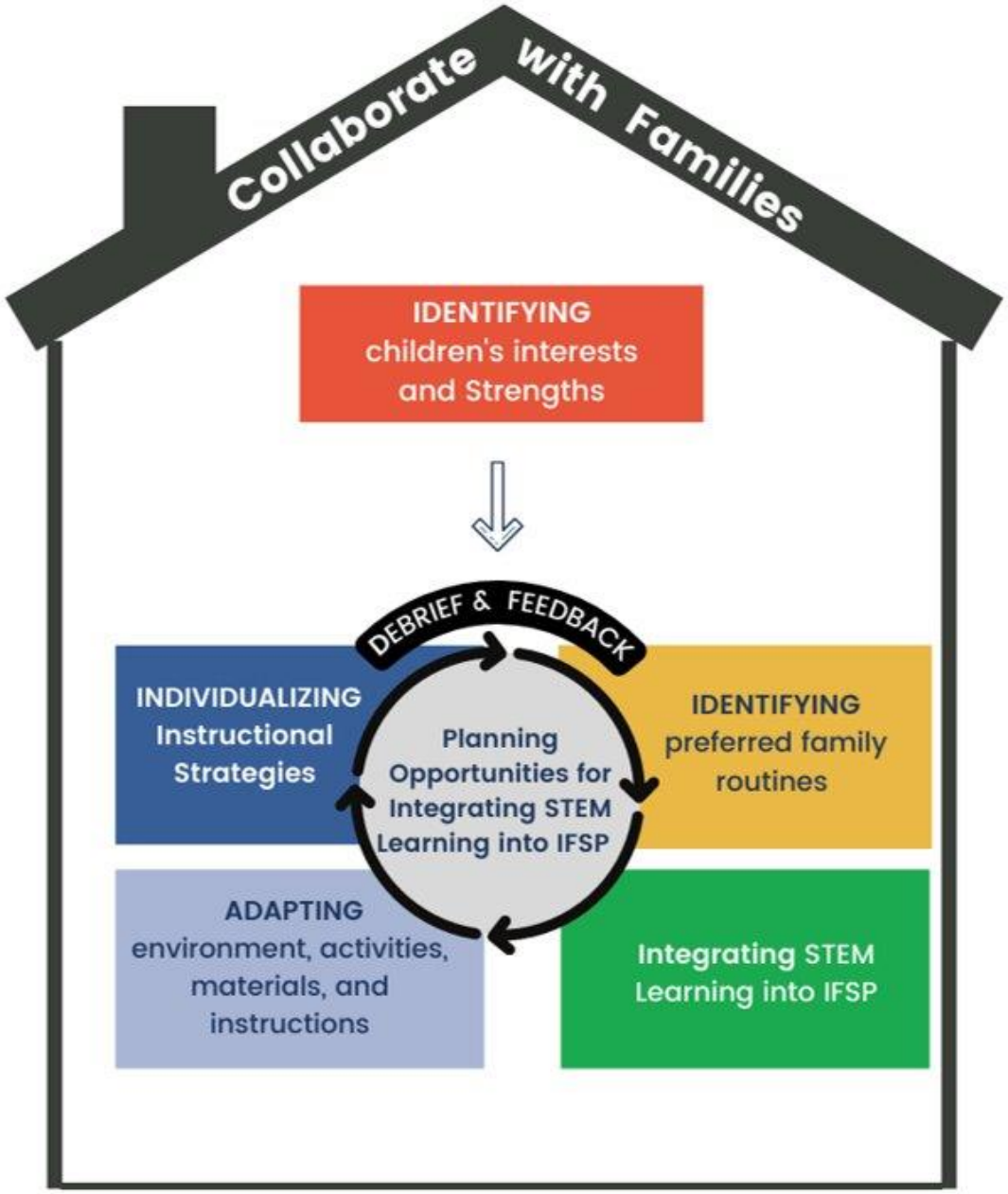
Working with families in EI

Before the visit: ECTA reflection checklist

Sample Reflection Questions

- Be responsive to the family's unique life circumstances
- Engage the parents in identifying family concerns, priorities, and circumstances that are most important to them
- Engage family members in identifying which steps or actions will be done independently by the family and which steps or actions will be done in collaboration with a practitioner
- Use an everyday activity checklist to have a parent select which activities would be easiest for the parent to us

STEM Experience Framework for EI



Yang, H-W., Campbell, P., & Lim, C-I. (2022). Supporting STEM Learning within Routines for Infants and Toddlers with Developmental Delays. *Young Exceptional Children.* https://doi.org/10.1177/10962506221145674

All About Me!

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.

My name is _____

I am _____ years old.

I speak _____

I live with _____

_____

My personality is _____

_____

My top 5 favorite things:	My top 5 favorite activities:	I am really good at:
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.

I sometimes need help with:

My goals are:

STEMIE INNOVATION FOR INCLUSION IN EARLY EDUCATION

The contents of this resource were developed under a Cooperative Agreement between the U.S. Department of Education, Office of Special Education Programs (OSEP) and the University of North Carolina at Chapel Hill. #H327G180006. These contents do not necessarily represent the policy of the U.S. Department of Education, and you should not assume endorsement by the Federal Government.

Example Questions

- What makes the child smile/laugh/happy/feel good?
- What gets the child to try new things?
- Which routines feel easiest for you and your child? Which ones feel more challenging?
- How do you typically support your child when something is hard for them?
- Are there particular routines where you'd like more ideas for helping your child learn or participate?
- Can you tell me about what mealtime usually looks like in your family?

Observations

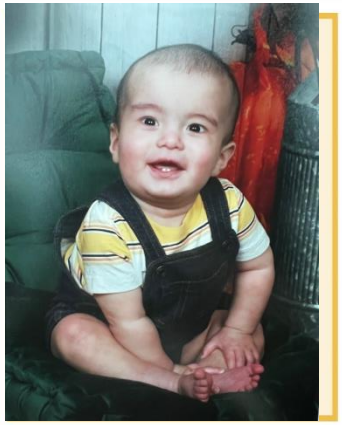
- How does the child interact with materials?
- How does the child communicate and interact with others?
- How does the child approach a challenging task?

All About Me - Oliver

- Multiple Ways to get information
- Collaborate with families
- Family Advocacy Tool

All About Me!

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.



- My name is Oliver
- I am 1 years old
- My mom speaks Mandarin and my dad speaks English
- I live with my mommy, daddy,
- My personality is: energetic and curious

My Top 5 Favorite Things:

1. Balls
2. Cars
3. Dinosaurs
4. Bubbles
5. Banana

My Top 5 Favorite Activities:

1. Playing with Balls
2. Going to the park
3. Grocery shopping
4. Watch mommy cooking

I am really good at:

Trying to do things on my own

I sometimes need help with:

Upper body strength, Balance, coordination, communication, drinking liquid, recognize emotions

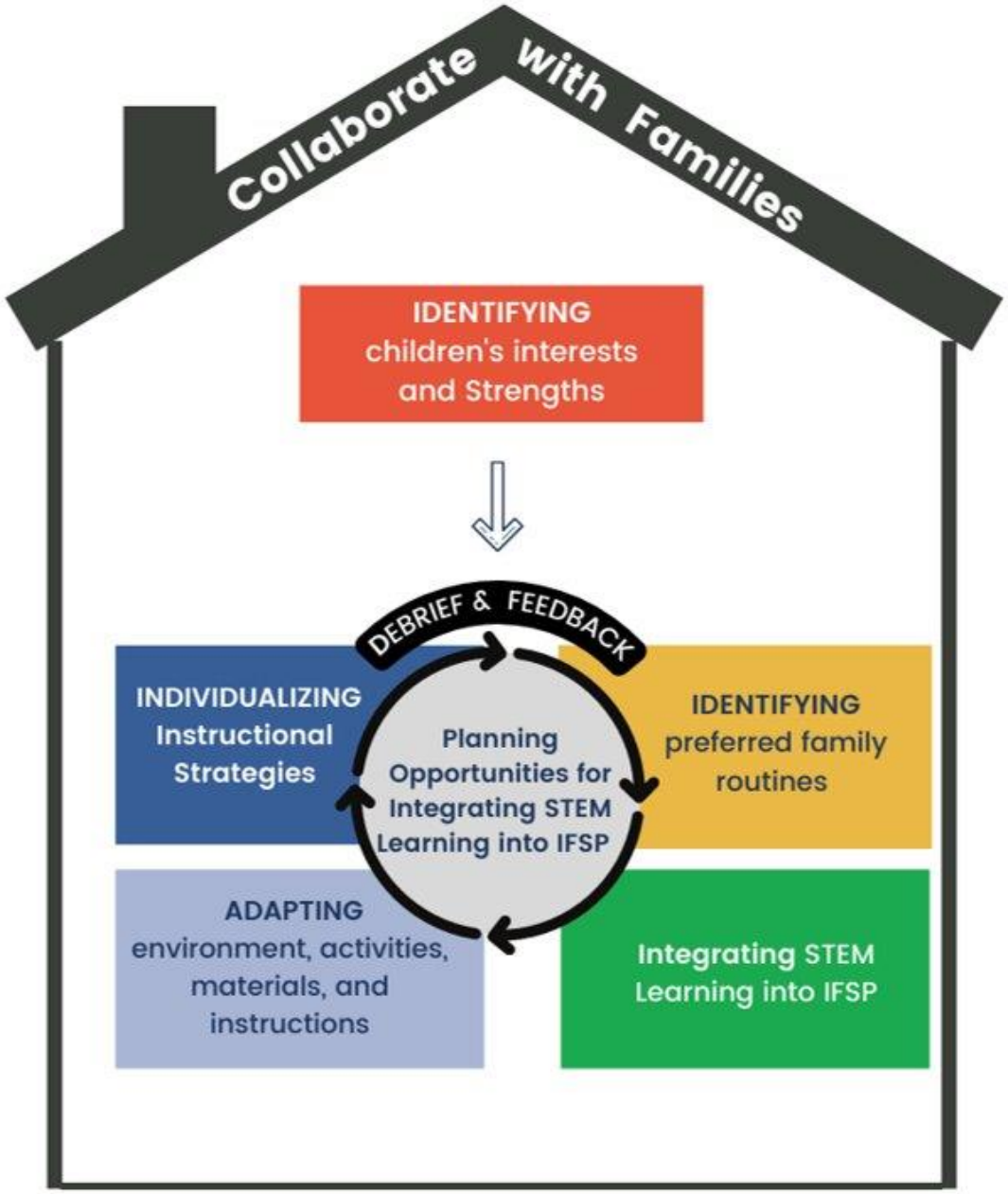
My goals are:

- I will be able to let mommy knows what I wants and how I feel when going outside together

STEMIE INNOVATION FOR INCLUSION IN EARLY EDUCATION

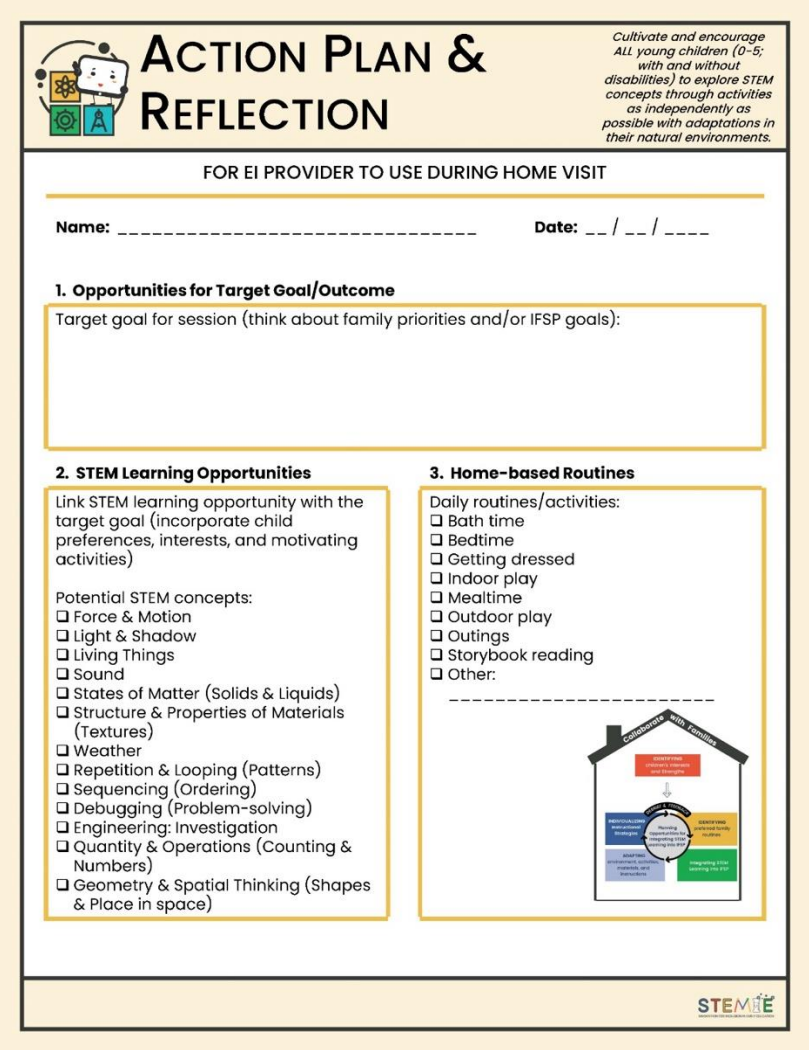
The contents of this resource were developed under a Cooperative Agreement between the U.S. Department of Education, Office of Special Education Programs (OSEP) and the University of North Carolina at Chapel Hill. #H327G180006. These contents do not necessarily represent the policy of the U.S. Department of Education, and you should not assume endorsement by the Federal Government.

STEM Experience Framework for EI



Yang, H-W., Campbell, P., & Lim, C-I. (2022). Supporting STEM Learning within Routines for Infants and Toddlers with Developmental Delays. *Young Exceptional Children.* https://doi.org/10.1177/10962506221145674

Action Plan & Reflection Tool



Action Plan & Reflection

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.

FOR EI PROVIDER TO USE DURING HOME VISIT

Name: _____ **Date:** __ / __ / ____

1. Opportunities for Target Goal/Outcome

Target goal for session (think about family priorities and/or IFSP goals):

2. STEM Learning Opportunities

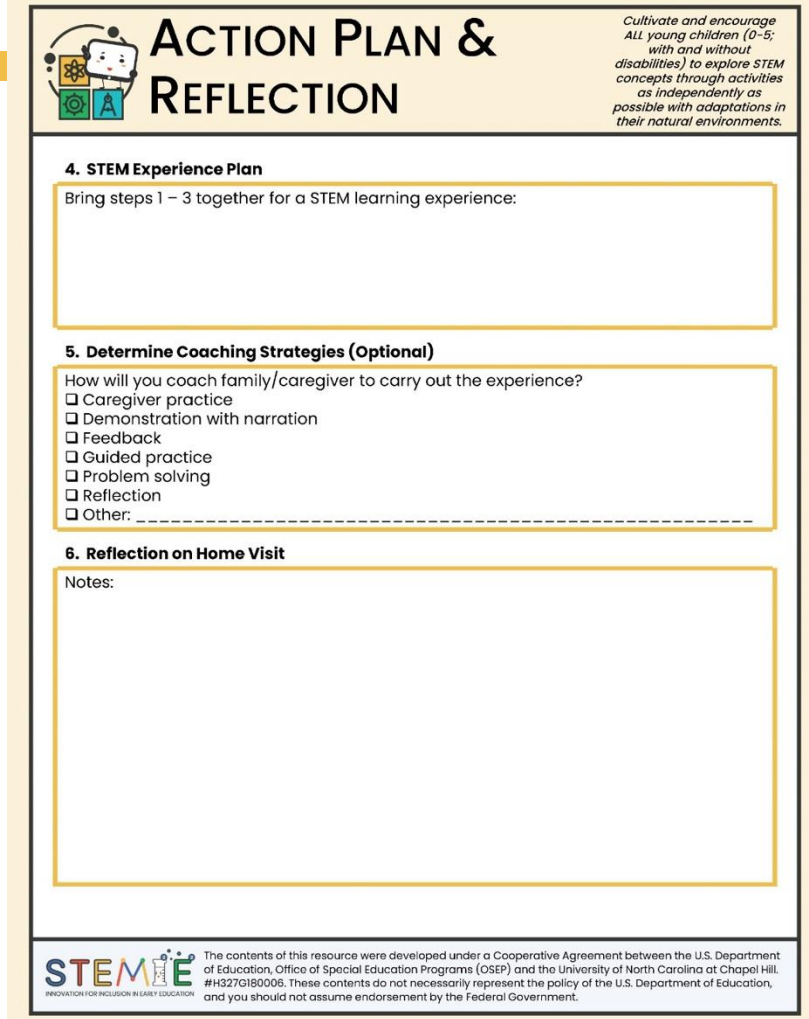
Link STEM learning opportunity with the target goal (incorporate child preferences, interests, and motivating activities)

Potential STEM concepts:
- ❑ Force & Motion
- ❑ Light & Shadow
- ❑ Living Things
- ❑ Sound
- ❑ States of Matter (Solids & Liquids)
- ❑ Structure & Properties of Materials (Textures)
- ❑ Weather
- ❑ Repetition & Looping (Patterns)
- ❑ Sequencing (Ordering)
- ❑ Debugging (Problem-solving)
- ❑ Engineering: Investigation
- ❑ Quantity & Operations (Counting & Numbers)
- ❑ Geometry & Spatial Thinking (Shapes & Place in space)

3. Home-based Routines

Daily routines/activities:
- ❑ Bath time
- ❑ Bedtime
- ❑ Getting dressed
- ❑ Indoor play
- ❑ Mealtime
- ❑ Outdoor play
- ❑ Outings
- ❑ Storybook reading
- ❑ Other: _____

STEMIE



Action Plan & Reflection

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.

4. STEM Experience Plan

Bring steps 1 – 3 together for a STEM learning experience:

5. Determine Coaching Strategies (Optional)

How will you coach family/caregiver to carry out the experience?
- ❑ Caregiver practice
- ❑ Demonstration with narration
- ❑ Feedback
- ❑ Guided practice
- ❑ Problem solving
- ❑ Reflection
- ❑ Other: _____

6. Reflection on Home Visit

Notes:

STEMIE INNOVATION FOR INCLUSION IN EARLY EDUCATION

The contents of this resource were developed under a Cooperative Agreement between the U.S. Department of Education, Office of Special Education Programs (OSEP) and the University of North Carolina at Chapel Hill. #H327G180006. These contents do not necessarily represent the policy of the U.S. Department of Education, and you should not assume endorsement by the Federal Government.

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

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

What is children's goal?

- When shopping with his family, Oliver will let his family know what he wants and how he feels. He might express wants and feelings by pointing to foods he wants, shaking his head when he doesn't want something, or using a picture card to say "tired", so he can take part in shopping with his family.

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

What communication opportunities are naturally in the routine?

- Grocery Shopping
  - Picking apples
  - Riding in the cart
  - Choosing between foods

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

Ways to embed STEM in Communication Opportunities

- Picking Apples
  - Mom: How many apples do we need? One or two? (Pause and wait)
  - Oliver: (sounds like he is saying “two”)
  - Mom: Do you want the big apple of the small apple (show Oliver both)
  - Oliver: (Point to the big apple)
  - Mom: Okay, Big Apple it is

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

How can we support parents

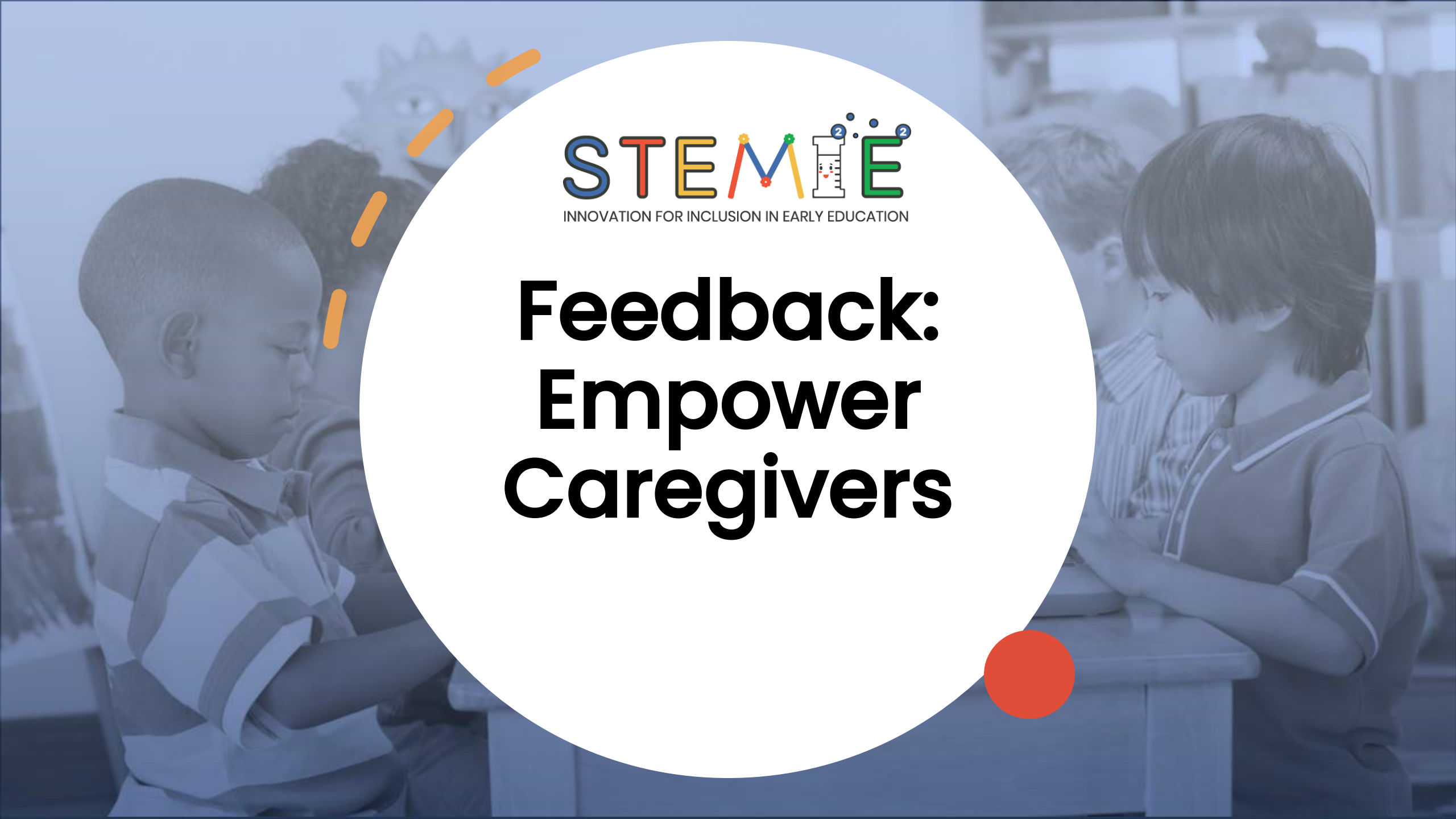
- **Observe**
  - Watch Oliver and his mom's interaction
- **Modeling**
- **Provide information:**
  - *It sounds like he started to say 'two.' You can expand by giving him more words to go with it, like 'two apples.*
  - *You don't need to do this for every item you shop for. Just pick one or two moments during each trip, depending on your schedule and how the day is going. These small opportunities can help build both his communication skills and his understanding of STEM concepts*
- **Invite parents to try and ask questions**
- **Feedback and reflection**
  - What did you notice?
  - I like how you paused after you asked a question. It gives Oliver time to respond.

Practice
(Grocery shopping: Putting items in the cart)

How would you support parents in embedding STEM learning opportunities and communication learning opportunities into grocery shopping?

Using Reflective Practices with Families

- Throughout the visits
- What worked and what didn't work
- Joint summary and next steps



STEMIE

INNOVATION FOR INCLUSION IN EARLY EDUCATION

Feedback: Empower Caregivers

Using Reflective Practices with Families

Picking Apples

General	Specific
Way to go!	I noticed you gave him the choice between one or two apples. That helps because he is practicing **number concepts** and using **words to communicate his choice**
Great job!	"I like how you emphasized the words 'one' and 'two.' That supports his **vocabulary for numbers** and helps him understand how **words connect to quantities**."
Fantastic timing!	"I noticed you repeated back what he said—'two apples.' That reinforces the **connection between numbers and real objects**."

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

Adapted from Provide Specific Feedback (FRGBI, 2020):

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

Formula for providing feedback

- **Step 1: Notice the action**
- **Step 2: Explain why it matters** (how it supports development, communication, or STEM)

Try it out

Example 1

- Dad rolls a ball.
- Child pushes it back with both hands.
- Dad smiles and claps.

Try it out

Example 2

- Papa points to a picture in the book and says, “Look, a dog!”
- The child touches the picture.
- Papa says, “Yes, dog. Woof woof!”

STEMIE

INNOVATION FOR INCLUSION IN EARLY EDUCATION

Feedback: Support families provide feedback to their child

Using Reflective Practices with Families

General	Specific
You got it!	Look at you taking big girl steps without mom's hands!
That's awesome!	You're trying to pull up, aren't you? Show mommy how strong you are.
You're a good friend!	You gave baby brother a toy. Now you can play with your race cars together.
Yay!	You worked so hard pulling your sock on.
Good for you!	You are standing up so tall, now you can reach the book that is on the table.
A big hug for you!	I heard you say "babababa"! You must want your bottle.
You are catching on!	Listen to all those sounds! You must be telling dad it's his turn to roll the ball.
Congrats!	You got all those Cheerios to your mouth!
Thank you!	You helped mom when you scooped the dog food into the bowl.
That's the best!	Daddy helped you get your cracker. It's yummy.

Formula for providing children feedback

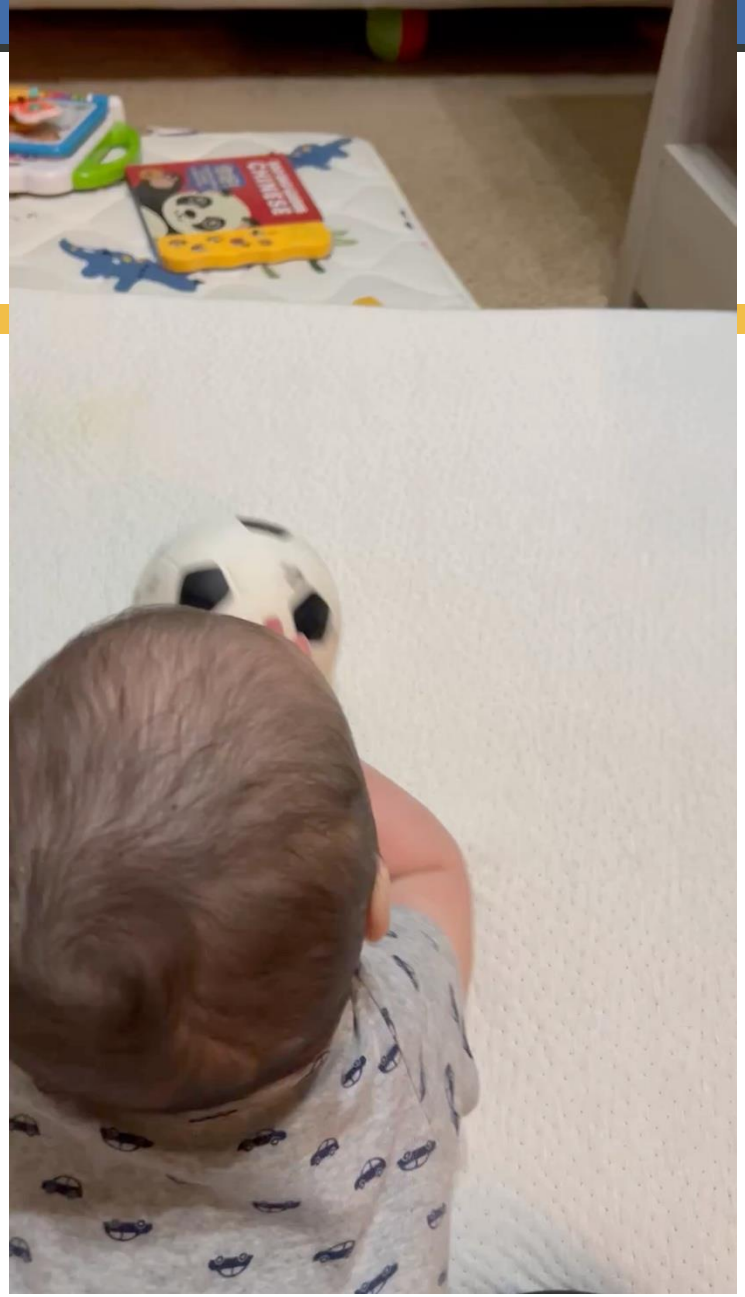
- **Step 1: Notice the action**

Step 2: Name what the child did well

- **Step: (optional) Invite them to try again or add a challenge**

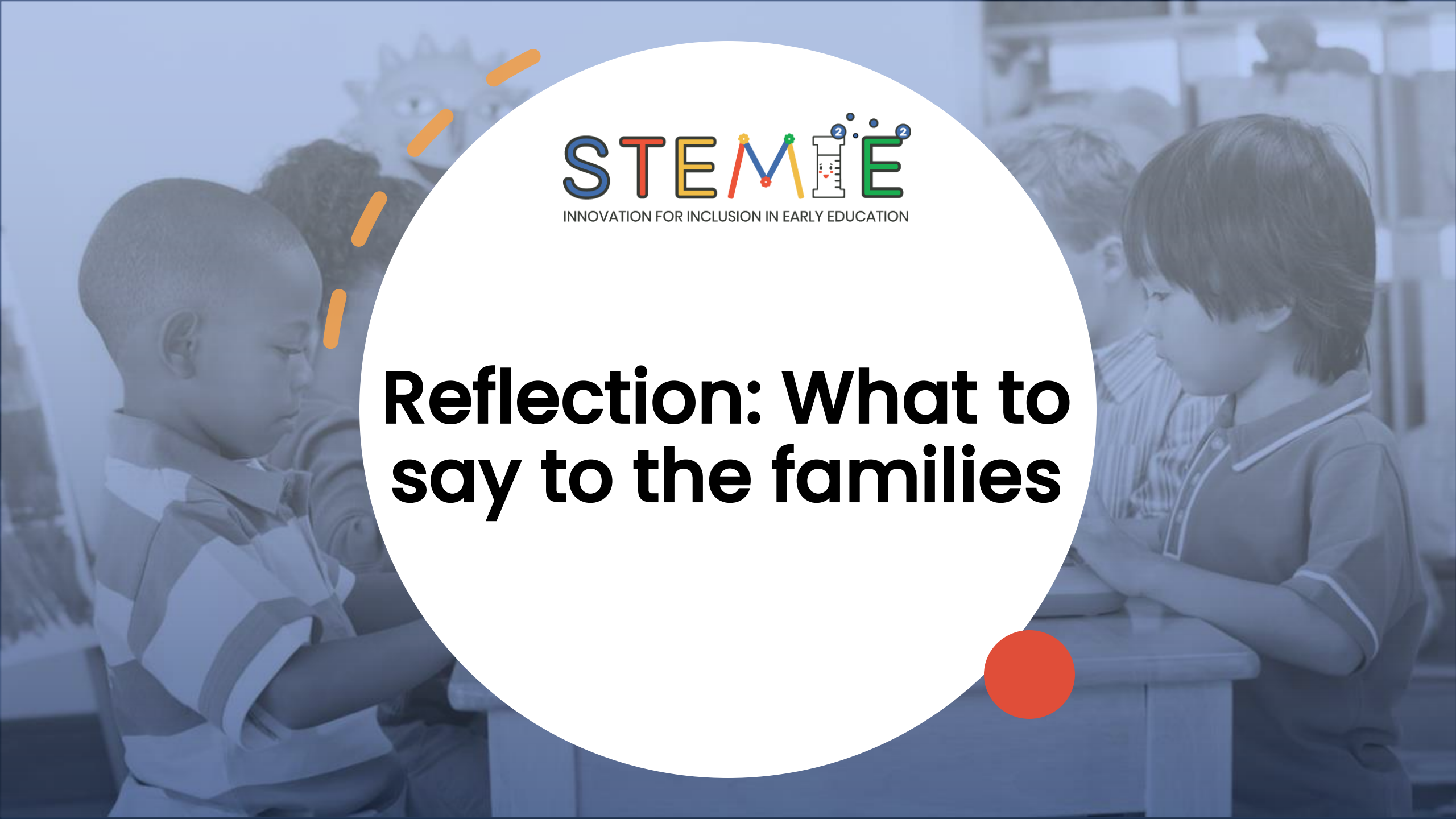
Try it out

- As you watch this clip, think about two things: (1) What would you say to the parent? (2) What would you encourage the parent to say to the child?



STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION



STEMIE

INNOVATION FOR INCLUSION IN EARLY EDUCATION

Reflection: What to say to the families

Using Reflective Practices within coaching

Category	Purposes	Example questions
Awareness (Check in)	• Find out what's known • Past and present	• What else have you tried? • What does it look like? • When does [child's name] get the most upset? • Tell me more...
Alternative (Dig in)	• Brainstorm • Consider New Ideas for the Future	• What might you do differently to make that happen? • What ideas do you have? • What do you need to know? • How can you change this routine to encourage [child's name] to feed themselves more independently? • What do you think could work better next time?

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

Using Reflective Practices within coaching

Analysis (Dig Deep, Compare and Contrast Answer the Why and the How)	• What's Underneath? • Past , Present, Future	• How well is it working? • Why do you think it happened? • What have you done in similar situations? • Why do you think he/she/they responded that way? • What did you do differently this time that made it easier for her? • How does what happened compare to what you want to happen?
Action (Just do it)	Steps to Develop & Implement the Plan	• What is the Plan? • What's the first step? • When will you be able to do it? • What supports might you need to make this happen? • What would you like to do together today?

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

Using Reflective Practices with Adult Learners

Video Description:

The video clip shows a child, Gabe, and his mom engaging in a STEM learning experience during mealtime. Gabe enjoys trying new things. His mom is encouraging Gabe to explore the food and observe using different senses and feed himself independently. Gabe is working on independent feeding.

STEMIE. (2023). Video Reflection Guide – Mealtime. https://stemie.fpg.unc.edu/video-reflection-mealtime

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

Using Reflective Practices with Adult Learners

Reflection Questions:

As you watch the video the first time, think about

- How else could you support families to integrate additional STEM learning experiences during mealtime?

STEMIE
INNOVATION FOR INCLUSION IN EARLY EDUCATION

STEMIE. (2023). Video Reflection Guide – Mealtime.
https://stemie.fpg.unc.edu/video-reflection-mealtime

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

STEMIE Learning Trajectories

stemie.fpg.unc.edu

stemielearningtrajectories.fpg.unc.edu

facebook.com/STEMIIEE

instagram.com/stemie4all

stemie@unc.edu

youtube.com/@stemiiee

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

Stay Connected to STEMIE