A GUIDE TO TEACHING PRACTICES

At STEMIE, we first use adaptations to ensure each and every child, including young children with disabilities can fully participate and engage in STEM (science, technology, engineering, and math) learning opportunities and experiences at home, in early childhood programs, and in the community. However, some young children may require additional instructional supports from adults and/or peers to successfully engage in STEM learning opportunities and experiences.
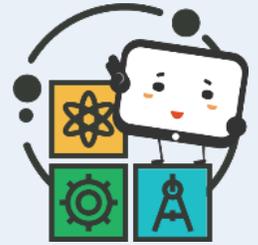
In this document, we define and describe evidence-based teaching strategies, as well as provide examples of each teaching strategy that adults may use to ensure young children with disabilities can participate fully in STEM learning experiences.

What are teaching strategies?

Teaching strategies are practices used by adults (e.g., family members, practitioners) or, in some instances, by other children to help facilitate children's participation in everyday routines, learning experiences, and activities. Using these strategies engages children in activities, maintains their interest, and provides opportunities for them to learn concepts and thinking skills that support STEM learning when using adaptations (see STEMIE's A Guide to Adaptations for more information) is not a sufficient support.

Continuum of Strategies

These teaching practices or strategies can be provided for individual or groups of young children by an adult or sometimes another child such as a sibling or another child in a classroom. Most often, strategies are used purposefully and in addition to adaptations so that children have the individual supports they need to fully engage in STEM learning. But some strategies may also occur naturally.

General Teaching Strategies

Some young children may require teaching strategies from adults to successfully engage in STEM learning opportunities and experiences.

- Engage with children in a positive encouraging manner
- Limit the number of children participating in an activity
- Modify an activity (shorten, extend, break into steps, add movement)
- Take turns with children
- Understand that children are engaging in purposeful play & learning (CARA's Kit, 2007)

Contents

Prompting

Help given by another person (usually an adult) to assist children in knowing how to do a given behavior or to perform a target behavior in the presence of a target stimulus (Sandall, Hemmeter, Smith, & McLean, 2005). Types of prompts may include verbal, gestural (pointing), and/or physical cues to encourage participation.

- Use prompt fade (i.e., reduced assistance) as needed to promote children's independence in the activities. For example, an adult might initially offer physical hand-over-hand support for a young child to sign the word "more", fade to prompting with an adult modeling the sign while saying it, and then fade to the adult saying "more?" as an oral prompt for the child to sign "more" independently.
- Use verbal prompts, gestures (e.g., pointing) and sign language in conjunction with spoken language during activities and songs to facilitate engagement (e.g., the adult might pair the sign for "next" with the spoken phrase 'Next, we need the jelly', then point to the jelly)
- Use visual and verbal prompts to facilitate progression through activities (e.g., a communication choice board paired with the verbal prompt "What's next?)

To reduce prompt dependence and increase child independence, it is recommended to use least-to-most prompting hierarchy. The level of prompting that is least intrusive to the prompting level that is most intrusive is determined by the child's needs and the setting and/or activity. Often physical prompting is considered the most intrusive level and verbal prompting, or verbal direction, is considered the least intrusive. For example, a natural prompt during water play might be to provide a cup for pouring. A gestural prompt would be to point to the cup and a verbal one would be to say, 'Pour the water'. A visual prompt might look like using a communication board or picture icons to show how to use the cup, while a modeled prompt would involve the adult demonstrating. Full physical support might involve taking the child's hands and showing them how to fill and pour the cup.
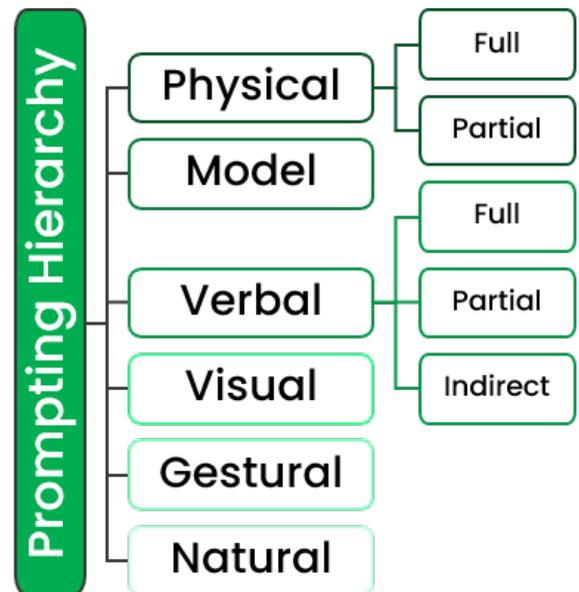
Scaffolding

Provide "prompts and hints to support the learner and then gradually withdraw these supports as the learner performs with increased independence" (Bodrova & Leong, 2012).

- Expand on children's responses and actions (see Descriptive Talking/Verbal Guidance)
- Introduce opportunities for problem solving ("I wonder what will happen if we turn on both faucets, fill this cup and then dump it.")
- Provide a generous amount of wait time before prompting again (e.g., 10-60 seconds depending on developmental level of child, see Wait Time)
- Use pictures/icons and/or words to break down a complex activity into smaller, more manageable, and clear steps (see Visual Cues in **STEMIE's A Guide to Adaptations**)
- Use questions to facilitate reflection and problem solving (e.g., "I wonder why the water made your fingers wrinkly?"; for more examples see **STEMIE's A Guide to Asking Open-Ended Questions**)
- Use visual and verbal prompts to facilitate progression through activities (see Prompting)
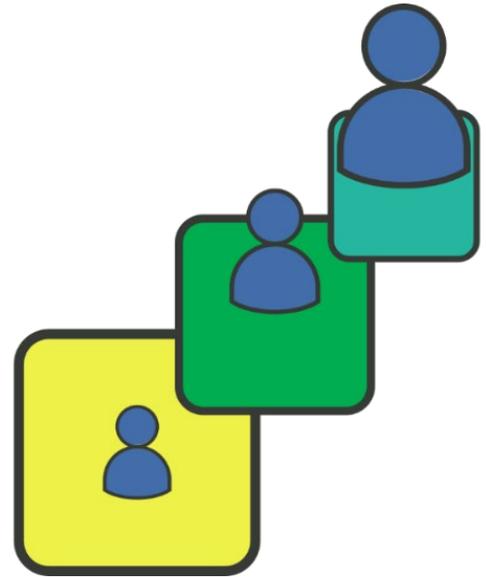
Modeling

Visually demonstrate and/or perform the target activity/behavior/skill to encourage participation

- Demonstrate activity when introducing and implementing (e.g., illustrate or model the use of number and comparison words [e.g., more, less, fewer, same] when introducing and implementing an activity [e.g., "I see you and Emma have the same number of counters, you both have three – Let's count them..."])
- Model expectations (e.g., show your hand slowly touching each counter, saying aloud 'One, two, three' to model using 1-1 correspondence)
- Model exploration and play
- Pair child with a peer who can model and reinforce key aspects of the activity
- Role-playing (e.g., saying 'Let's pretend we're playing with the counters. I'll count first, then you show me what to do!')

Descriptive Talking/Verbal Guidance

Use simple, clear, and meaningful vocabulary to expand upon what a child is seeing and/or doing

- Add new information and vocabulary (e.g., narrating 'I see your fingers are getting wrinkly from soaking in the water.")
- Expand on children's responses and actions (e.g., when a child says "wet!", expand by saying "Yes, the water is very wet!")
- Introduce the activity and show children what is expected (model where the water should stay [the container], and how it should be used [poured or dumped, but not thrown or splashed])
- Narrate what is going on by talking about what is happening – "You are putting your hands under the water – under the wet, cold water".
- Use vocabulary to describe the characteristics of the activity even if the child is just being introduced to particular words (hot/cold; wet/dry) or actions (splash, pour, dump)

Wait Time

Provide a generous amount of time for independent response

- Allow time for independent response
- Provide at least a 3-second pause in instruction to give a moment of reflection and/or to process the instruction
- Provide time for a child to ask their own questions
- Wait at least 3 seconds before calling on any child for an answer response after posing a question
- Wait at least 3 seconds for a response from child after posing a direct question or action to complete
- Wait for children to initiate interactions and activities and follow their lead and interests

Reinforcement

Provide immediate and specific feedback to encourage repeat performance

- Pair the child with a peer who can reinforce and model key aspects of activities.
- Use positive reinforcement with constructive feedback (e.g., if a child is struggling to fit a peg into a hole, say "Let's try turning it." and giving support to manipulate the peg)
- Use process-based reinforcement (e.g., "You are working so hard to fit all of the pieces together.")

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