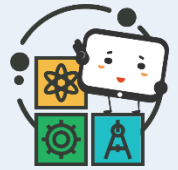


Adaptations

At STEMIE, we use adaptations to ensure young children with disabilities can fully participate and engage in STEM (science, technology, engineering, and math) learning opportunities and experiences.



In this document, we define and describe an evidence-based inclusion framework and provide definitions and examples of adaptations that adults can use to ensure young children with disabilities can participate fully in STEM learning experiences.

Inclusion Framework

The inclusion framework is informed by evidence-based inclusive practices (e.g., Campbell & Milbourne, 2007; DEC, 2014) and focuses on the supports adults can implement to facilitate STEM learning for children with disabilities.

Hierarchy of adaptations

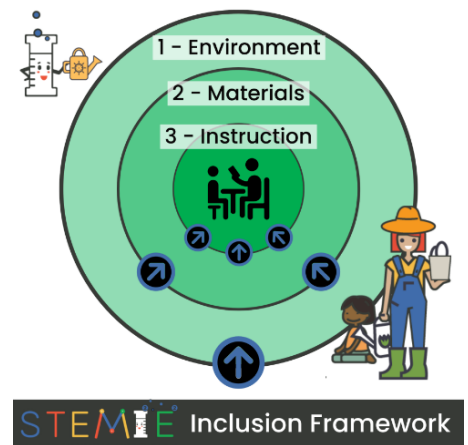
Within the hierarchy, adaptations to the environment and materials are aligned to the Division for Early Childhood (DEC) Recommended Practices on environment while instructional adaptations are aligned to the Recommended Practices on instruction.

- 1. Environment (e.g., room set-up, equipment, how an activity is done, length of time)**
- 2. Materials (e.g., adaptations to toys, materials, assistive technology devices)**
- 3. Instruction (e.g., add information, reduce steps)**

The parameters of the framework are that 1) adaptations are not disability-specific, 2) adaptations can be used across all settings and be embedded in children's everyday routines and activities, and 3) adults should start with children's interests and preferences, and work to maximize children's strengths to promote positive and active learning experiences.

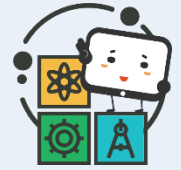
What are adaptations?

Adaptations are practices used by adults (e.g., family members, practitioners) to facilitate and/or individualize STEM learning and experiences within daily routines and the environment. Specifically, adaptations are changes to the environment, activities, routines, materials, and/or instruction to support full inclusion in learning experiences, while minimizing adult assistance (Campbell, Milbourne, & Kennedy, 2012).



1 – Environment

Environmental, activity, and/or routine adaptations are changes and/or accommodations in the setting and/or activity that support inclusive access to learning opportunities, embed interventions, and support full participation and independence for all children.



Area & Space

Arrange the environment and/or materials in a systematic way for a specific purpose



tape place mats for mealtime routines or use trays for manipulatives, games, and puzzles

Image Credit: CONNECT Module 1, 2009



modified seating (e.g., cube chair, chair with bumpers)

Image Credit: Feeding Littles



space between centers and tables for wheelchairs and walkers to maneuver

Image Credit: Creative Commons



limit background noise and distractions

Image Credit: Creative Commons



add rails to step stools

Image Credit: CONNECT Module 1, 2009



cover materials not needed for an activity

Image Credit: Creative Commons



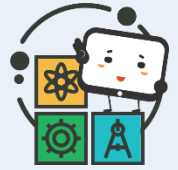
use standing and seating options so that all children are on the same level (e.g., stander at water table, floor-level support seat for group time)

Image Credit: CONNECT Module 1, 2009



1 – Environment

Environmental, activity, and/or routine adaptations are changes and/or accommodations in the setting and/or activity that support inclusive access to learning opportunities, embed interventions, and support full participation and independence for all children.



Within Reach

Arrange materials in a contained space for easier access



short bins for manipulatives, games, and puzzles
Image Credit: Creative Commons



plates, trays for manipulatives, games, and puzzles
Image Credit: BRIDGES Activities, 2021



low open shelves
Image Credit: Creative Commons

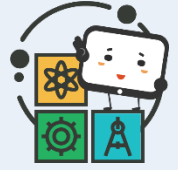


*extend waterspout
extend faucet
handle (e.g., pliers,
tubing)*
Image Credit: CONNECT Module 1, 2009



2 – Materials

Materials adaptations are changes and/or accommodations to materials that support inclusive access to learning opportunities, embed interventions, and support full participation and independence for all children.



Assistive Technology

Use of “any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities” (Sandall et al., 2005)



specialized technology (e.g., specialized toys/computers with switches, powered wheelchairs)

Image Credit: Creative Commons



big button switch to make an object do something specific (e.g., make gears spin on a toy, turn on a radio)

Image Credit: CONNECT Module 1, 2009



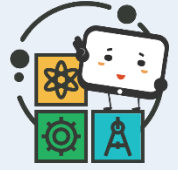
voice output to ‘say’ a simple phrase like ‘more, please’

Image Credit: CONNECT Module 1, 2009



2 - Materials

Materials adaptations are changes and/or accommodations to materials that support inclusive access to learning opportunities, embed interventions, and support full participation and independence for all children.



Grasping Supports

Add additional material(s) to an object to make it easier to grasp, lift, or turn



magnets or Velcro wrist bands to pick up materials

Image Credit: BRIDGES Activities, 2021



cups with handles

Image Credit: Creative Commons



grip tape and/or tubes to thicken handles

Image Credit: Creative Commons



deep bowls/plates for easier scooping

Image Credit: Creative Commons



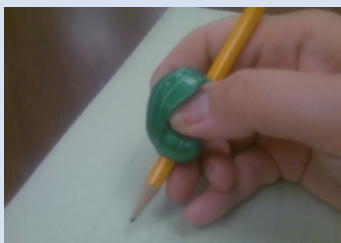
page fluffers to space apart pages of a book for easier turning

Image Credit: Paths to Literacy, 2018



stabilizers, like Velcro or rubber shelf liners, for activities, puzzles, and games

Image Credit: Creative Commons



alternative materials (e.g., soft, squeezable) to support grasping

Image Credit: Creative Commons



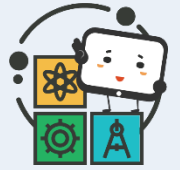
low-tech materials (e.g., Velcro on blocks, tabs, padded handles for toys, tools, and utensils)

Image Credit: Paths to Literacy, 2018



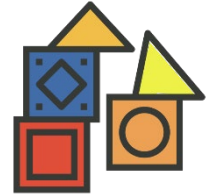
2 – Materials

Materials adaptations are changes and/or accommodations to materials that support inclusive access to learning opportunities, embed interventions, and support full participation and independence for all children.



Variety of Materials

Provide a variety of materials of different sizes, shapes, colors, and/or textures to increase interest and accessibility



*alternative materials to support grasping (e.g., soft, squeezable; see **Grasping Supports** for more examples)*

Image Credit: Creative Commons



materials that stack or interlock easily (magnetic tiles, bristle blocks)

Image Credit: Creative Commons



high contrast materials (e.g., puzzles, shapes) for visual discrimination

Image Credit: Creative Commons



mix of different sizes, colors and/or textures

Image Credit: Creative Commons



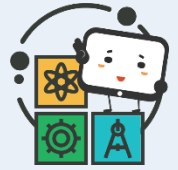
prop/story boxes (e.g., items/objects related to the books or theme) for books to increase engagement and understanding

Image Credit: Paths to Literacy, 2018



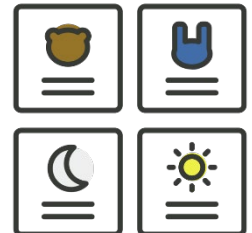
2 – Materials

Materials adaptations are changes and/or accommodations to materials that support inclusive access to learning opportunities, embed interventions, and support full participation and independence for all children.



Visual Supports

Add to and/or visually modify an object or material to increase interest



simplify book text

Image Credit: STEMIE Storybook How To Adaptations, 2020



add tactile outlines to book illustrations

Image Credit: PACER Simons Center on Technology



add child's name and/or picture of the child

Image Credit: STEMIE Storybook How To Adaptations, 2020



create picture cards of key words/ideas for books

Image Credit: CONNECT Module 1, 2009



colored borders to focus attention

Image Credit: Infopeople



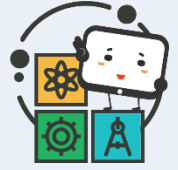
use concrete objects or visuals for participation (e.g., a number chart or small objects a child and/or teacher can point to while counting)

Image Credit: Creative Commons



3 – Instruction

Instructional adaptations and/or individualized instruction are changes and/or accommodations to the instruction or teaching that support inclusive access to learning opportunities, embed interventions, and support full participation and independence for all children.



Support for Communication

Use a variety of methods of communication (e.g., sign language, gestures) to meaningfully engage children



communication devices (see **Assistive Technology** for more examples)

Image Credit: Creative Commons



use sign language in conjunction with spoken words

Image Credit: Creative Commons



First/Then board or a choice board

Image Credit: CONNECT Module 1, 2009



communication book

Image Credit: Creative Commons



Speak slowly and clearly and ensure the child can see you during activities and songs



narrate children's actions (e.g., counting, building, waterplay)



build vocabulary by using and defining words (e.g., you chose a red block; you put that on top)

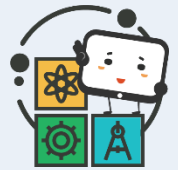


use gestures in conjunction with spoken words



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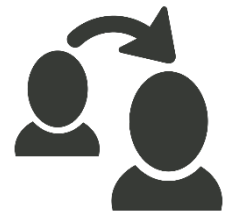
Instructional Strategies

Use systematic teaching procedures to support learning and participation (DEC, 2015)

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...”])*
- *pair child with a peer who can model and reinforce key aspects of the activity*
- *role-playing*
- *model expectations*



Prompting

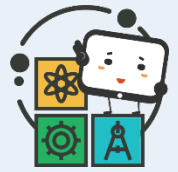
Help given by another person (usually an adult) to assist children in knowing how to do a given behavior or to perform a target behavior in the presence of a target stimulus (Sandall, Hemmeter, Smith & McLean, 2005). Types of prompts may include verbal, gestural (pointing), and/or physical cues to encourage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

- *visual and verbal prompts to facilitate progression through activities*
- *use verbal prompts, gestures (e.g., pointing) and sign language in conjunction with spoken language during activities and songs to facilitate engagement*
- *use prompt fade (i.e., reduced assistance) as needed to promote children’s independence in the activities*



3 – Instruction

Instructional adaptations and/or individualized instruction are changes and/or accommodations to the instruction or teaching that support inclusive access to learning opportunities, embed interventions, and support full participation and independence for all children.



Instructional Strategies (continued)

Use systematic teaching procedures to support learning and participation (DEC, 2015)

Reinforcement

Provide immediate and specific feedback to encourage repeat performance

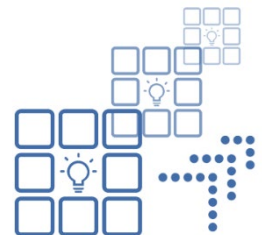
- *pair the child with a peer who can reinforce and model key aspects of activities.*
- *use of process-based reinforcement (e.g., "You are working so hard to fit all of the pieces together.")*
- *use of positive reinforcement*
- *use of constructive feedback*



Scaffolding

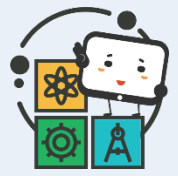
Provide "prompts and hints to support the learner and then gradually withdrawing these supports as the learner performs with increased independence" (Bodrova & Leong, 2012).

- *use questions to facilitate reflection and problem solving*
- *provide a generous amount of wait time (see **Wait Time**)*
- *expand on children's responses and actions*
- *use pictures/icons and/or words to break down a complex activity into smaller, more manageable, and clear steps*



3 – Instruction

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Instructional Strategies (continued)

Use systematic teaching procedures to support learning and participation (DEC, 2015)

Wait Time

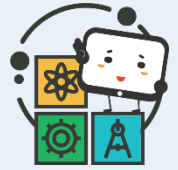
Provide a generous amount of time for independent response

- *provide at least a 3-second pause in instruction to give a moment of reflection and/or to process the instruction*
- *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*
- *provide time for a child to ask their own questions*



3 – Instruction

Instructional adaptations and/or individualized instruction are changes and/or accommodations to the instruction or teaching that support inclusive access to learning opportunities, embed interventions, and support full participation and independence for all children.



Visual Cues

Use pictures and/or icons to signal next steps



prompt cards (e.g., pictures of activities and centers)

Image Credit: Creative Commons



First/Then prompts

Image Credit: Creative Commons



use visuals that clearly illustrate the activity

Image Credit: Creative Commons



choice boards

Image Credit: Creative Commons



*use concrete objects to represent schedule (see **Visual Schedules**)*

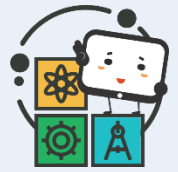


add a graphic organizer to aid reading comprehension



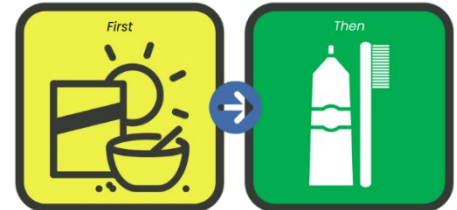
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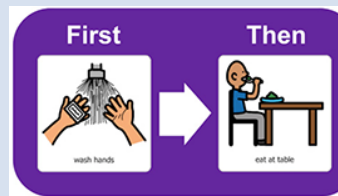
Visual Schedules

Use a picture and/or icon list with words for transitions and routines to provide structure and predictability



daily schedule with pictures or photos of the routine

Image Credit: Creative Commons



*First/Then board (see also **Visual Cues**)*

Image Credit: Creative Commons



class schedule

Image Credit: Creative Commons

Washing hands	
	Water on
	Hands wet
	Rub hands with soap
	Rinse
	Water off
	Dry

task analysis

Image Credit: Creative Commons