

A GUIDE TO...

CROSS-CUTTING CONCEPTS

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.

Cross-cutting concepts are a set of overarching big ideas that look and behave similarly across all STEM (science, technology, engineering, and math) domain areas.

Are you interested in helping your child learn about STEM concepts? Are you looking for ways to support and extend your child's STEM learning?

Use this guide to learn about what cross-cutting concepts are and how to use them to support STEM knowledge development.



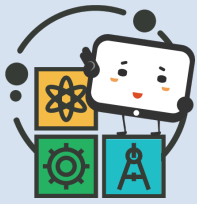
WHAT ARE CROSS-CUTTING CONCEPTS?

Cross-cutting concepts are a set of overarching big ideas that look and behave similarly across all STEM (science, technology, engineering, and math) domain areas.

A child's progression of learning, or how their STEM (science, technology, engineering, and math) knowledge develops, is cultivated through their experiences, observations, and guidance from people in their environments.

CROSS CUTTING CONCEPTS

- ▶ **Cause & Effect**
- ▶ **Connections**
- ▶ **Form & Function**



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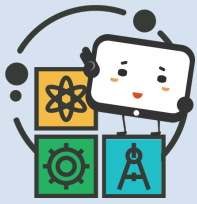
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CROSS CUTTING CONCEPT

Cause & Effect: The relationship between two actions and/or events where action/event A (cause) makes action/event B (effect) happen or where action/event B is the result of action/event A.



Short Name	Progression Step	Example of what this progression step might look like
Action Taker (Foundational)	Takes action to cause event	Child pushes snack off highchair tray
Cause and Effect Recognizer (Expanding)	Recognizes that a simple conditional (e.g., If/Then) connects a condition to an outcome	Child pushes snack off highchair tray and watches dog eat it
Cause and Effect Identifier (Expanding)	Identifies what made the event happen	Child playing in sand box requests a cup of water to make more of the sand hold together



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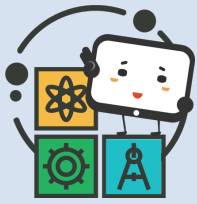
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CROSS CUTTING CONCEPT

Connections: When something repeats in a predictable manner, such as relationships (e.g., parent and child) and patterns (e.g., seasons, Fibonacci shell, ocean tides).



Short Name	Progression Step	Example of what this progression step might look like
Intuitive Relationship Recognizer (Foundational)	Notices and creates mental relationships	Infant knows their parent's scent and seeks them for comfort
Event Relationship Recognizer (Expanding)	Recognizes patterns in events occurring within short periods of time	Toddler expects repetition of previously experienced events at childcare, first snack time, then family comes to pick them up
Sensory Relationship Recognizer (Expanding)	Recognizes patterns and relationships using any of the five senses	Child participates in songs with repetition
Relationship Identifier (Expanding)	Identifies patterns among objects and living things using observation of characteristics (e.g., structure, shape, and/or material)	Child groups together a set of animal figures that have similar color and body shape
Relationship Generalizer (Expanding)	Generalizes identified patterns to other objects, future events, or living things	Child says, "It's cold outside, but it will be warmer in the afternoon." which is a common pattern in their region



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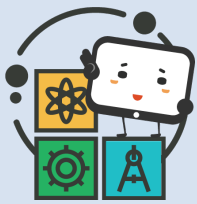
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Form & Function: Form is the shape of an object or thing, and function is the form's purpose or what action it performs



Short Name	Progression Step	Example of what this progression step might look like
Form and Function Observer (Foundational)	Explores the characteristics and properties of observable systems in the living and non-living world	Child exploring how to hold the spoon
Form and Function Recognizer (Foundational)	Recognizes that the structure (i.e., characteristics such as shape and materials) of living and non-living things affects how they function for a specific purpose	Adult asks child while holding a spoon and a fork, "Which one do you think would be best to use to eat cereal?" Child chooses the spoon.
Form and Function Identifier (Expanding)	Identifies how the structure (i.e., characteristics such as shape and materials) of living and non-living things affects how they function for a specific purpose	Child identifies why would they use a spoon instead of a fork for eating cereal



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GLOSSARY

Action Taker - does something to cause an event

Generalizer - applies something known about something/someone/event to another something/someone/event

Identifier - verifies the identity of something/someone/event

Observer - perceives and explores something of interest

Recognizer - shows awareness that they experienced something/someone/event before and it is familiar

Quick Tip:

For more information about Cross-Cutting Concepts, be sure to check out the **STEMIE Learning Trajectories** website:

<https://stemielearningtrajectories.fpg.unc.edu/cross-cutting-concepts/>

