

# Computational Thinking for All Children

UNC FRANK PORTER GRAHAM CHILD DEVELOPMENT INSTITUTE

UNIVERSITY OF DENVER MORGRIDGE COLLEGE OF EDUCATION

IDEAS that Work Office of Special Education Programs

Marsico Institute FOR EARLY LEARNING

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## Why Computational Thinking (CT)?

- Aligns with ways children naturally learn and play
- Concepts are naturally motivating to children
  - Causation
  - Repetition
  - Looping
  - Conditionals
  - Decomposition
  - Debugging
  - Sequences, Patterns & Algorithms
- Technology increasingly

Computational Thinking: (CT) “needs to be an integral element of all education, giving every learner the capacity to evaluate information, break down a problem, and develop a solution through the appropriate use of data and logic.” (Committee on STEM Education, 2018, p. 23-24)

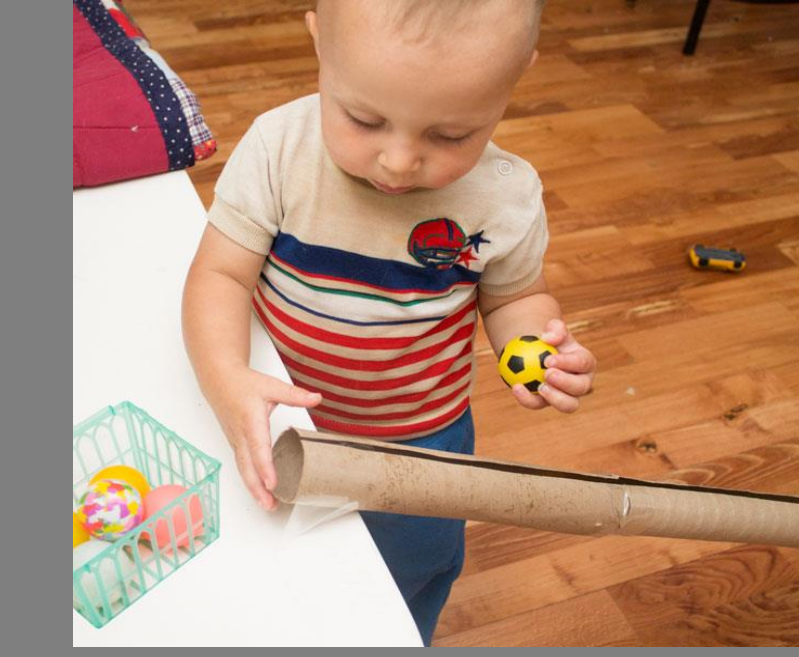
**Repetition:** Doing the same action more than one time

- Narrate “You did it AGAIN!”
- Encourage repetition with toys and play & variation
- Ask questions “What happened last time?”



**Causation:** The idea that one event made another one happen

- Narrate “That happened because XYZ!”
- Use simple cause effect toys
- Ask open ended questions



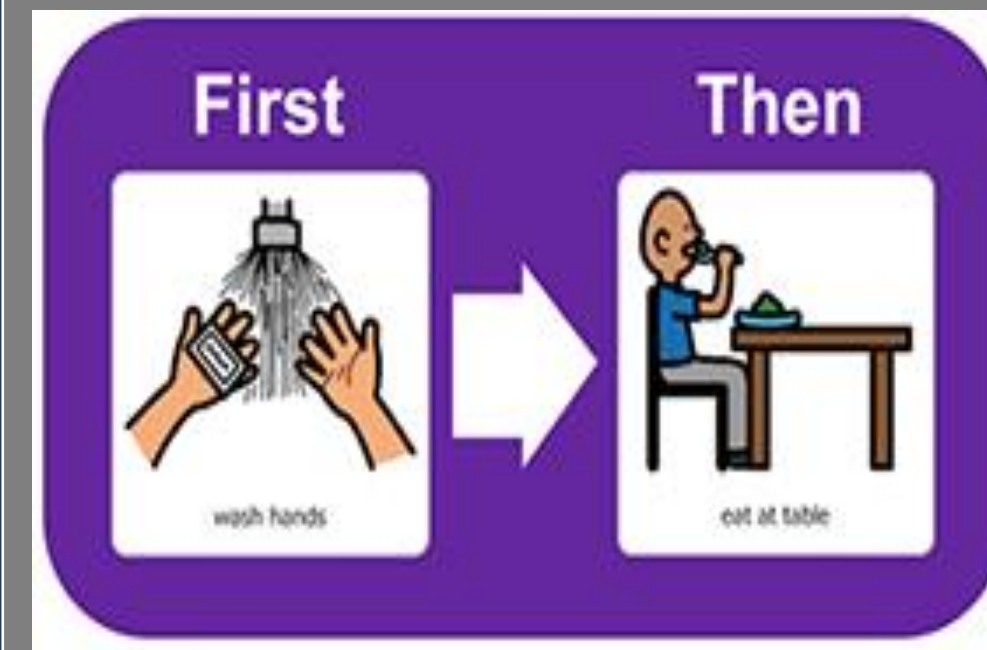
**Looping:** A series of the same steps done repeatedly to complete a task

- Narrate “You are doing the same thing over and over until you are done!”
- Ask questions “How many times should we do it?”



**Conditionals:** The idea that one thing happens IF another happens first

- Narrate “If we don’t water the plants, they won’t grow”
- Ask questions “What happens if XYZ?”



**Debugging:** Discovering errors and fixing them

- Narrate “Oh no! That didn’t work the way you wanted it to. What do you think went wrong?”
- Ask questions “How can you find out what went wrong?”

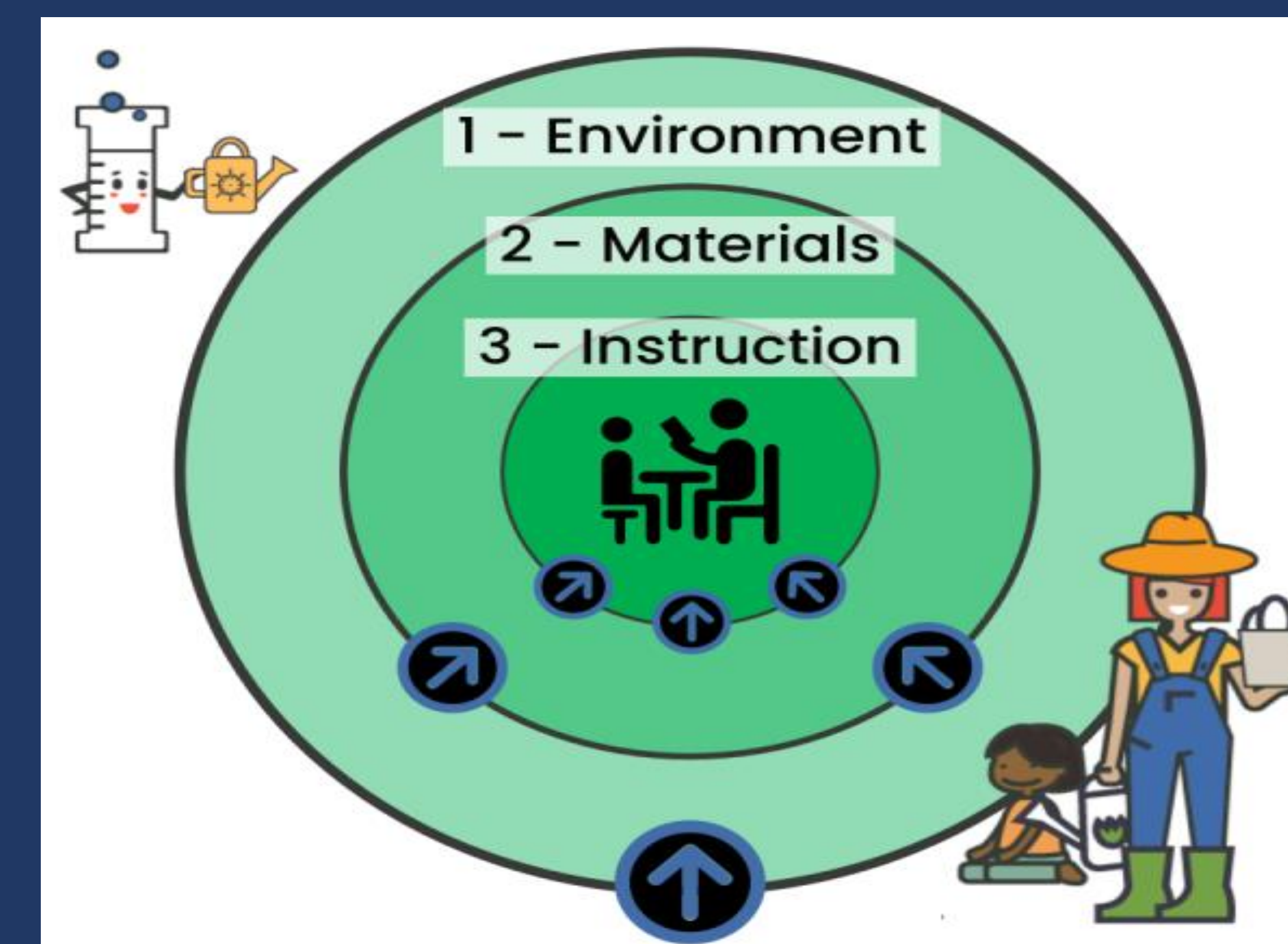


**Decomposition:** Taking apart; breaking down into smaller parts to solve a problem

- Narrate “You took that toy apart”
- Ask questions “How did you solve that problem?”



## Adapt Activities for ALL



STEMIE Inclusion Framework

**Sequences, Patterns, & Algorithms:** Series of steps done in a particular order to complete a task

- Narrate “First we, then we...”
- Ask “What steps do we to take to make...”



## SO WHAT?

- Need to integrate accessible foundational CT into daily routines
- Help children understand they are developing skills for CT
- Encourage exploration and facilitate problem solving throughout activities
- Ensure ALL children have access to and participate in foundational CT activities

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