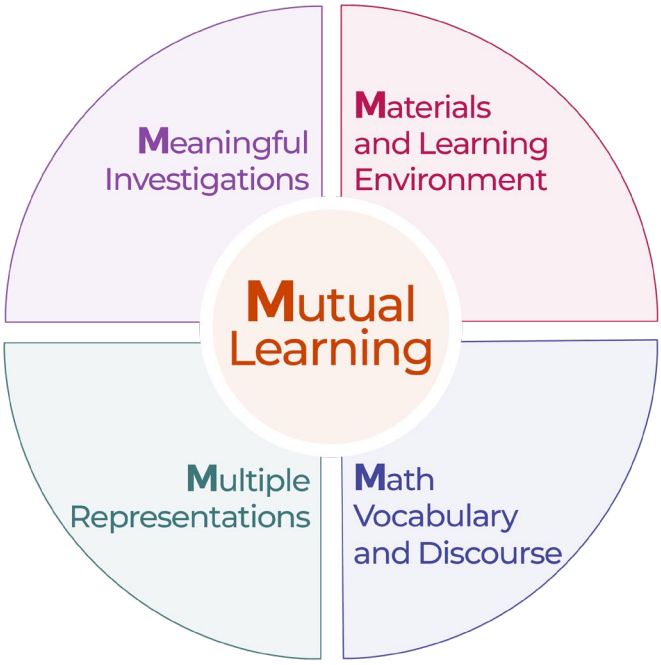
Preschool/TK/K

# Using M$^5$ to Support Spatial Thinking Skills

This handout provides specific examples for each M$^5$ Early Math Practice to help educators support children's spatial thinking.




## Mutual Learning

Observe and learn about children's languages, cultures, strengths, and needs to provide relevant and individualized learning experiences about spatial thinking.

- **Notice children's understanding and use of spatial vocabulary.**
  - What vocabulary and languages do children use to describe positions, locations, or directions?
  - Children who are multilingual learners may use spatial vocabulary in their home languages, English, or both. Support their learning by using visuals or gestures with verbal descriptions.
- **Meet the needs of children with varying abilities by providing multiple ways to explore spatial thinking and express knowledge.**
  - Offer opportunities for children to draw, use gestures, or use computer programs to explore and show their knowledge of spatial positions.
- **Incorporate children's cultures and lived experiences into activities that support spatial thinking.**
  - Invite children to build models of their favorite spaces with blocks, shapes, or other materials.

## Meaningful Math Investigations

### Provide activities for children to solve problems using spatial navigation or mental rotation.

- **Invite children to solve problems using spatial thinking.**
  - Ask children to build a bridge that is strong and big enough to hold a plastic animal. Encourage them to describe their bridge and test it.
- **Play games that invite children to give and follow spatial directions for moving within a space.**
  - Ask children to hide an object (for example, a special toy) and give each other directions on how to find it. Encourage children to consider how they will describe the location of the object.
  - Create obstacle courses for and with children. Invite children to describe how their peers might move through the obstacle course.

## Materials and Learning Environment

### Provide open-ended materials that allow children to move through their environment and explore objects.

- **Offer materials that reflect children's cultures, languages, and interests.**
  - Encourage families to share objects, tools, or recycled materials from home (for example, empty food containers) that children might build with or manipulate in different ways.
- **Provide materials that encourage children to put things together.**
  - Offer blocks, puzzles, interlocking cubes, or tangrams.
- **Support children to explore ways different materials move and fit inside containers in different ways.**
  - Set up sensory tables with interesting materials, such as sand, water, or slime along with containers, cups, and spoons of different sizes.

- **Consider using computer programs that allow children to explore the orientation, position, and location of objects.**
- **Read books that have themes related to spatial thinking and that are in children's home languages, English, or both.**
  - *Have You Seen My Dragon?* by Steve Light
  - *Pete the Cat, Rocking in My School Shoes* by Eric Litwin
  - *Round Trip* (*Ida y vuelta* in Spanish) by Ann Jonas
- **Provide open space and age-appropriate equipment for children to move their bodies in different directions and observe various perspectives.**
  - Encourage children to explore different perspectives from the top and bottom of a slide.

## Math Vocabulary and Discourse

### Invite children to describe the position, direction, and distance of objects.

- **Highlight spatial language during routines, everyday interactions, and play.**
  - "Move so you are **between** two friends."
- **Support children's understanding of spatial vocabulary by using gestures when explaining spatial rotations or movements. Encourage children to do the same.**
  - Move your hand to the left as you say, "Place the block to the left of the bear."
  - If children are explaining how they moved an object, say, "Show me what you mean."
- **Use open-ended questions and prompts to invite children to discuss the position, direction, or distance of objects.**
  - "Where is the ball?"

**Spatial Vocabulary**

- Position: on, in, over, under, behind, in front of, between
- Direction: up, down, left, right, across, upside down
- Distance: near, far, long, farther, away

## Multiple Representations

### Offer multiple ways for children to explore spatial relationships.

- **Invite children to express spatial thinking in a variety of ways, including verbal communication, gestures, moving objects, or drawings.**
  - Play "I Spy" and invite children to find objects based on spatial directions. For example, "I spy a bear under the chair" or "I spy something round next to the tree."
  - Ask children to use their bodies to build a structure together. For example, two children might make an arch or the number four.

- **Offer opportunities for children to show spatial thinking through interactions with their environment.**
  - Explore outside together and invite children to make observations about the location of objects around them.