

Practice representing:

- ◆ Introduce children to a wide variety of representations – pictorial (drawings, maps), graphical (bar graphs made from stacked objects, timelines, pictographs), and symbolic (tables, prose descriptions).
- ◆ Use representation to help children remember what they did and explain their reasoning.
- ◆ Invite children to verbally or concretely represent a concept.
- ◆ Refer to your own representations.

Intentional teachers pose thoughtful questions and provide children with supportive feedback to support and extend their spontaneous play. Below are suggested questions that provoke extended conversation about the math concepts (Copley, 2000). These questions correspond with the five developmental strands from the Preschool Learning Foundations.

Number Sense:

- ◆ How many more are in this group?
- ◆ Is there any other way to show...?
- ◆ Can you show me another way to make...?
- ◆ What number comes after...? Before...?
- ◆ How is this number different from...?
- ◆ What would happen if I put 10 more with this number? Ten less?
- ◆ What if I cover some of these...? How many are hidden?
- ◆ You have told me that 5 and 6 are parts of 11. Are there different numbers that are parts of 11?
- ◆ Do you think there are more than 10 in this set, less than 10, or about 10?
- ◆ Do you think there are more than 100 in this set or less than 100?
- ◆ How many are there in...?
- ◆ Can you count backwards from...? Can you count forward from...?
- ◆ How many different ways can I make the number...?
- ◆ About how many beans are in my hand?

Algebra and Functions:

- ◆ How are these alike? How are they different?
- ◆ Do you see a pattern? Tell me about it.
- ◆ What comes next? How could we make this pattern with these different materials? Could you tell a friend about this pattern and see if he can pick out which one you mean?
- ◆ How can we remember this pattern? How can we make a picture that will help us? Could we use numbers? How?
- ◆ Can you dance your pattern? What would you do first? Second?
- ◆ Do all of these crayons belong in the same group?
- ◆ Can these toys be put into different groups?
- ◆ Tell me about these two things: Which one is bigger (heavier, smaller, lighter, more, less)?
- ◆ How would you group these beads?
- ◆ Why do these belong here? Why does this not belong?
- ◆ Is there anything that doesn't belong here?
- ◆ Can you find [or make] another one that would go in this group?
- ◆ What name would you give this group?

Geometry and Spatial Sense:

- ◆ How is this shape like that one? How is it different?
- ◆ Why isn't this shape an [oval]? What makes it a [circle]?
- ◆ What if I turned this shape? What if I flipped it? What would it look like if I slid it from your paper to my paper?
- ◆ Where have you seen this shape before?
- ◆ Can you find something like this at home?
- ◆ (When a child has made a picture out of shapes) How did you decide to use this triangle for the roof?
- ◆ How did you decide what to copy/draw?
- ◆ Can you tell me how to get to the [park] from here?

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- ◆ Can you tell me about the neighborhood you built with blocks?
I'm going to draw a map of it without looking. So tell me what it looks like and what I should put where.
- ◆ Do you think this shape would roll? Slide? Could we stack these?
- ◆ How could you cut this paper to make another shape?
- ◆ What shape could you make out of these shapes?
- ◆ Could we make the cone roll straight, or would it roll crooked?
What about the cylinder?
- ◆ What would happen if I dropped this [cube, cylinder] and it broke in half? What would the parts look like? Could it break in half another way?
- ◆ Can you think of another name for this shape?
- ◆ Can you make a square [a triangle, a rectangle] with pipe cleaners?
How about a ball [a box, a cone]?
- ◆ What is next to you?
- ◆ Can you crawl under the table and over the blocks?

Measurement:

Length:

- ◆ Which one is longer? Shorter?
- ◆ How much ribbon will you need to go around this? How can you figure it out by just looking?
- ◆ Can you put these straws in order from the shortest to the longest?
Show me how you know your answer is right? Where would you put this fourth straw? How did you know?
- ◆ You are measuring how long the desk is. What are you counting?
Show me how you are measuring.

Area:

- ◆ Which shape can you cover with the most/least number of blocks?
- ◆ Will it take more blocks to cover the table or to cover the book?
Explain how you know your answer is correct.

Weight:

- ♦ Which is heavier? Lighter? How do you know?
- ♦ Put these three blocks on the balance, one at a time. How can you tell which rock is the heaviest? The lightest?

Capacity:

- ♦ Which of these two containers holds more/less? Why do you think so?
- ♦ How can you find out which container holds more water?

Mathematical Reasoning:

- ♦ Which group has the most? How can you tell without counting?
- ♦ Which group has the least? How can you tell without counting?
- ♦ What does this graph tell you?
- ♦ I wonder how this could be changed?
- ♦ Tell me about the red in the circle. Is it more than the blue? Less than the blue? More than half? Less than half [in experiences relating to circle graphs]
- ♦ How do you know we need 5 slices of pizza?
- ♦ I wonder why this group is bigger. What do you think?
- ♦ What shape will fit in that puzzle?