

CORE SKILL: THINK – MATH

Operations



What You Need to Know

Once children have had experience with numeracy, or the ability to work with and understand numbers, they can begin to practice with number operations. Operations consist of joining sets together or separating them into parts. Keep in mind that the larger the numbers, the more difficult the problems. During the early childhood years, operations consist of some key skills, including:

- ◆ Sharing fairly or equally – equally partitioning or distributing a set of objects into a given number of equal parts
- ◆ Addition – the process of combining numbers (or set of objects) to make a total
- ◆ Subtraction – the inverse of addition, requiring children to recognize that numbers (or sets of objects) can be separated to make another number

Things to Consider

Early and basic operation skills that children learn during the early childhood years set the foundation for more complex arithmetic and word problems later. Keep in mind that solving basic addition and subtraction problems is far easier for children when they have concrete manipulatives to work with. Additionally, when math is made meaningful to children, such as when they are asked to solve problems in which they use operations to determine the number of minutes they have left to play or add up the number of treats they'll each get during a special celebration, they are much more likely to attend and retain what they learn.

Development of Operations

Between 36 and 48 months, children may:	Between 48 and 60 months, children may:
Share objects equally between two people by dealing out objects to make small groups (typically working with quantities of objects that result in four or fewer objects in each of the small groups).	Share objects equally between two or more people by dealing out objects to make small groups (typically working with quantities of objects that result in five or fewer objects in each of the small groups).
Add and subtract very small groups of objects non-verbally.	Add and subtract small numbers (up to 2+3) using objects or figures to represent objects.

Setting the Stage

Activities and materials that support the development of early operations skills:

- ◆ Use what you have: when it comes to early childhood operations learning, you don't need special materials or classroom arrangements to support learning. You can make math moments happen anywhere using anything at all. For example, use subtraction strategies to determine how many children are absent or addition strategies to determine how many more children are needed for a full soccer team during outdoor play.
- ◆ Games involving operations: play games that encourage children to add and take away, such as games where they roll two dice and have to add the number to move the corresponding number of spaces.
- ◆ Routines, Transitions, and Meals: incorporate opportunities for students to share fairly and focus on basic addition and subtraction, or take away skills, across the day. Invite children to help you determine how many children are in a group altogether after two students come in late to join the existing group of two students (e.g., "We already had 2 friends in our group, and now 2 more are here. Altogether we now have 4 friends in our group.").



Intentional Teaching Practices to Support Operations

OBSERVE	<p>Observe</p> <p>Observe children to see if they are focused on combining or separating groups of objects independently. During pretend play, do they share toys fairly, dealing out a baby to each of the children in the group? Or when they know that the limit for a particular center is four children and there are only three in the center, do they indicate that they need to add more children?</p>
FOCUS	<p>Model Addition and Subtraction Strategies</p> <p>Narrate your own operations of putting numbers/objects together or separating them, using concrete objects to represent the operations.</p> <ul style="list-style-type: none"> ◆ <u>Sharing Fairly</u>: “I know you all want to play with cars on our ramps. Let’s make sure you all get the same number of cars. I’ll pass out 1 to each of you, and now I’ll pass out another 1 to each of you. We each have 2 cars to play with!” ◆ <u>Addition</u>: “We already added 1 cup of flour to our muffin batter. We need to add 1 more. When we put 1 cup and 1 cup together, we’ll have 2 cups of flour!” ◆ <u>Subtraction/Take-Away</u>: “I have 5 dollars to spend in our store. Can I buy that doll for 3 dollars? OK, here are 3 dollars. How many do I have left? I’ll count, 1, 2. I have 2 dollars left.”
SCAFFOLD I	<p>Prompt Children to Add and Subtract Using Objects</p> <p>With support, encourage children to add and subtract using concrete objects:</p> <ul style="list-style-type: none"> ◆ Go on a bug hunt outside in small groups, encouraging each child to count how many bugs they find. Then have them come together and work to add together the number of bugs they found altogether in their group. ◆ Call attention to addition and subtraction during Meals (e.g., “You have 5 raisins. Oh, you ate one! Now how many do you have? That’s right, you have 4 left.”). <p>For nonverbal children, offer visuals (e.g., number line, numbers with visual representation of amounts) so they can point to indicate their response, or by using gestures (e.g., holding up fingers, pointing to objects while counting, using manipulatives).</p>
SCAFFOLD II	<p>Prompt Sharing Fairly</p> <p>Model and support children to equally partition objects:</p> <ul style="list-style-type: none"> ◆ During a game, deal out one piece to each child, then a second piece to each child, continuing this process until each child has an even number of pieces. Reinforce that sharing fairly means that each child has the same number of pieces. Sharing fairly can be a difficult concept for many children! Provide additional supports by labeling items as ‘yours, mine, theirs,’ dealing items onto each child’s placemat, or dealing items onto a 5- or 10-frame. These verbal and visual supports can help children focus more on the math concepts involved in sharing. ◆ Invite children to help you pass out items to one table for meals or snacks, focused on ensuring that each of the four children at the table receives an even number of items (e.g., 2 slices of cheese and 3 apple slices), supporting them to use dealing out strategies as they pass out items.
KEEP IT GOING	<p>Consider what you learned from observing children on Monday as well as their reaction to your Focus and Scaffolds. Find ways to build the activities from Setting the Stage into your regular routines.</p>