

# Non-symbolic relations and combinations



ECE resources

The number skills involved in non-symbolic relations and combinations involve comparing and combining sets of objects. In early childhood, children can differentiate and compare sets of small quantities, and approximately distinguish between larger quantities varying in number. Non-symbolic combinations involve children being able to recognise and understand basic concepts of addition and subtraction with small sets of items. With experience and practice, the precision of children's non-symbolic number skills sharpen over time. A strong foundation in non-symbolic relations and combinations is predictive of later maths achievement. These skills include magnitude comparison, and non-symbolic combinations (simple arithmetic).

## Magnitude comparison

This skill is about determining the larger or smaller of two sets of objects (such as buttons), or determining the largest or smallest of several sets, without necessarily counting them.

### How to spot this skill being applied in free play

You might hear children:

- Using language like 'more' and 'less' to describe two or more groups of objects (for example, 'He has more blocks than I do!')
- Making judgements about a single set of objects being 'a lot' or 'a little' (for example, 'that's a lot of apples!')

You might notice children:

- Using a balance scale to compare two groups of objects, or simply looking back and forth at two different groups of objects as if to compare their set sizes.

### How to check for understanding

During children's play, you might ask them to point to the larger or smaller of two sets of objects, or to the largest or smallest of several sets.

Note that the smaller the difference between the set sizes and the larger the set sizes become (such as 8 vs. 9 marbles), the more difficult the comparison. You may need to define 'smaller/fewer' for children first.

### Guided activities to support magnitude comparison

- **War card game:** compare which set of dots on two cards is larger (focusing on the dots and doing a rough comparison). A variation can involve identifying the smaller of two sets.
- **Playing with a toy balance scale:** practise putting different amounts of objects on each side of the scale and talking about why each side goes up or down in relation to the number of objects on each side. It is best if the objects are the same size and type, to keep the focus on quantity.

## Non-symbolic combinations (simple arithmetic)

This skill refers to children working with and changing sets of objects by adding or taking away items from the set, and recognising that this creates a change in the set.

### How to spot this skill being applied in free play

You might hear children:

- Talking about simple addition and subtraction facts ( $1+1=2$ ).
- Talking about combining or reducing set sizes ('we need one more block for our tower', or 'there are too many toys in the box, we need to take some out').

You might notice children:

- Adding to or reducing the set size of groups of objects (for example, taking a blue marker from a friend's marker supply, or creating a block tower and putting additional blocks on top or taking some blocks off the tower).

### How to check for understanding

You might place a small set of objects one by one into an opaque box or under a cloth (so that the objects are hidden), and then either add to the set by placing additional objects inside one by one, or reduce the set by removing some objects one by one. Then, give children their own set of objects to represent or recreate the resulting set of objects.

### Guided activities to support non-symbolic combinations

- **Share out a set of objects** between children, one at a time, noticing how the number of things is getting bigger and bigger, and that each child has more and more. Then have children post them into a posting box or throw into a basket, and notice how they have fewer as the game continues.
- **Create a shared artwork**, with children drawing or making fish for a collaborative underwater scene. Attach each onto a sea background. As you add each sea creature, notice how full the sea is getting. You might also draw a pretend shark, and enjoy watching it taking away one creature at a time, until the creatures are all gone. An easy way to add and take away simple drawings is using a whiteboard and eraser. For example, you might draw a range of fruits and vegetables, and have the children come and wipe away one at a time with the eraser as they 'eat it up'. You can tell simple addition and subtraction stories as you draw.
- **Read [The Very Hungry Caterpillar](#)**: emphasise how small he is in the beginning, how he eats one more food item each time (have children guess how many things he will eat on the following page), and talk about how much bigger he gets after adding so much food to his stomach.

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### Erica Zippert

Dr. Erica Zippert is a Postdoctoral Research Associate at Purdue University. She studies young children's broad mathematics development and how it is supported during social and playful interactions with parents and peers in a variety of informal contexts. She also examines the roles of context (traditional activities/games as well as digital apps/eBooks, activity goals), and parent and child factors (parental beliefs, child math abilities and interests) in determining the quality of early math experiences and subsequent math learning.