TABLE 1

The authors used students' misconceptions to design five activities to build the kindergartners' knowledge of length and measurement.

Activities to address students' challenges with the concept of length			
Challenges	**Misconceptions behind the challenges**	**Connections between misconceptions and activities (rationale)**	**Examples of activities provided**
Comparing based on visuals	Failure to consider the concept of length as an attribute	Students need to engage in activities that help them focus on length as an attribute through directive comparison.	First activity • Aligning a pair of objects of different lengths to compare their lengths • Comparing two equal-length straws in different positions or with differently spaced dots
Focusing on notion of length as countable	Counting given lines or parts consisting of the path without using units or unit iteration	Students need to experience measuring a variety of different-length objects by directly comparing the length or indirectly comparing using unit cubes or nonstandard units.	Second activity • Ordering ten Cuisenaire® rods by length • Describing the relationship between two different-length rods by measuring them with unit cubes Third activity • Doing a scavenger hunt to find appropriate objects in real-life environment using given referent units
Using the measurement tools inappropriately	Using measurement tools without considering units, unit iteration, and calibration* between different units	Students need to participate in measuring large objects or curvy paths through indirect comparison using appropriate measurement tools.	Fourth activity • Measuring large objects in the classroom using two nonstandard units • Finding the relationship between measurements and the size of the nonstandard unit chosen Fifth activity • Measuring three curvy paths on the floor

Note: We did not design activities focused on calibration because we believed the concept is too advanced for kindergartners, but we tried to encourage students to think about the relationship between measurements and the size of the nonstandard unit chosen as a necessary foundation for understanding calibration.