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<div align="center">Graduate Exceptional Students
Intervention/Accommodation Research</div>

Problem: Mr. Z in my class has trouble counting and a lack of number sense.

Interventions/Accommodations:
1. Use an approach called The Number Worlds program.

This article by Sharon Griffin explores the use of the Number Worlds' array of different activities to successfully help at-risk kindergarteners to develop number sense, show average to above-average performance on follow-up testing during 1st grade learning, and display significant gains on a number of transfer tests.

To implement this program in a classroom, divide the students in the classroom into heterogeneous groups of about 4 or 5 students. There are five different forms of numbers represented by the games included in Number World which include "groups of objects in Object Land, dot-set patterns and numerals in Picture Land, position on a path or line in Line Land, position on a vertical scale in Sky Land, and position on a dial in Circle Land" (p. 41). To help develop counting skills, a game from Line Land would do well. The game specifically described for the kindergarten grade level involves moving a pawn along the path of a board-game numbered 1-10. As the students move along the path, they are required to count aloud and should be encouraged to predict and explain their movements. Students should take turns to move around the board, which allows all the students to gain extra input by hearing other students count.

Citation: Griffin, S. (Feb. 2004). Teaching Number Sense. In *Educational Leadership*, (Vol. 61, N5), pp. 39-42.

2. Do repeated plays of a number game called "The Great Race."

In this two experiment study, Siegler and Ramani found that pre-schoolers from impoverished backgrounds had much poorer knowledge of numerical magnitudes than their peers from middle-income backgrounds and that having these students from low-income families play board games that required them to use consecutively numbered, linearly arranged, and equal sized squares improved their "numerical magnitudes" to equal status as their middle-income cohorts.

To implement this in the classroom, the original intervention would need to be changed a bit. The same board and spinner that displays only 1 and 2 should be used, but the game should be used with a small group of students playing together with the guidance and correction of the teacher. (The original intervention was conducted one-on-one between the experimenter and participants.) Only the game including numbers should be implemented since the researchers found that the game using colors did not help develop any number sense for the control group. Each child should spin the spinner, which will land on either 1 or 2. The child counts on from the point at which they are currently

positioned on the board; for example a child moving two spaces from space 4 would say, "5, 6," as he moved. This article suggests that if a child makes an error, the experimenter named the correct numbers and then had the child repeat the correct response while moving their game piece, thus the teacher should do the same. The games are described as being very quick; about 2-4 minutes when played one-on-one. This game was repeated about 30 times during the experiment, so it should also be implemented as much as possible in the classroom setting.

Citation: Siegler, R., & Ramani, G. (2008). Playing linear board games promotes low-income children's numerical development. In *Developmental Science*, 11.5, pp. 655-661.