

NUMBER TALKS FOR MULTILINGUAL LEARNERS

by

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Project Summary - [Number Talks](#)

Educators know that profound learning occurs when students are able to make meaningful connections and engage in academic discourse with their teachers and peers (Kazemi & Hintz, 2014; Moschkovich, 1999; Zwiers, 2008). We know that success in mathematics depends upon a strong foundation of number sense (Boaler, 2015). My interest in synthesising the most promising practices for language acquisition and the most promising practices for mathematics instruction led to my research question: *How can Number Talks affect academic achievement and language development of fourth grade multilingual learners?*

The purpose of this project was to incorporate Number Talks into the fourth grade math curriculum in order to develop number sense and promote student interaction and engagement in the language of mathematics. More specifically, the objective was to teach the language of mathematics and provide students with a daily routine and structure to produce and interact in this mathematical register. As a teacher of English learners (ELs), a significant part of my role is as a co-teacher in the mainstream classroom. I found the routine of Number Talks to be a promising instructional strategy that could be implemented in support of ELs as well as their native English speaking peers in the mainstream classroom.

Number Talks can take many forms and can be applied to any subject or level of mathematics, from Pre-K to the collegiate level. In order to introduce the routine in a way that optimizes engagement and participation, the Number Talks routine is introduced with a focus on subitizing skills, as recommended by Sun et al. (2018) and Humphreys and Parker (2015). Subitizing refers to the ability to identify the number of things in a set simply by looking at them quickly, rather than counting individual items. On alternating days, there will be opportunities for students to practice open number sentences, which provide opportunities to apply properties

of addition, subtraction, multiplication and division, as they are taught throughout the first months of the fourth grade math curriculum. Open number sentences also provide elementary students with the opportunity to use variables or unknowns to express a mathematical idea, an important mathematical skill that extends into algebraic strategies in secondary school. Number Talks will incorporate operations with whole numbers, demonstrating properties of addition and subtraction and later multiplication and division, and eventually addressing decimals and fractions, in alignment with the progression of the fourth grade curriculum.

There are several benefits to starting with subitizing skills with a fourth grade classroom. Most students have not experienced Number Talks, so teaching the routine will be new, as is the level of participation expected of students. The math should be easily accessible to all students in the room and can increase in rigor throughout the year. If the math is accessible, participation will be increased because the stakes will be low. Another benefit is that both the visual nature of the subitizing strategies and limited language required to participate are more likely to keep ELs engaged and confident in their ability to participate. The emphasis is on equity and accessibility.

There are many innate strategies to counting that are accessible even for students with limited or interrupted formal education (SLIFE) and these students will be able to share their strategies visually, drawing lines or circling clusters, lessening the cognitive load of language and increasing the likelihood of participation. The idea is to establish the expectations for participation and build on linguistic and mathematical strategies from this baseline. Number Talks that begin with subitizing provide opportunities for students to build recognition of numbers and their parts with low stakes prompts that build confidence and inclusion (Parrish, 2010).

With engagement as my focus, each Number Talk includes language supports that can provide structure for those who are less than proficient in grade level academic discourse. These structures will be taught to the whole class and reinforced in small groups, using explicit instruction and modeling of correct use. Supports will be posted for students to reference, but not required in student contributions. The focus should remain on students' ideas and the mathematical concepts being explored, according to Orosco et al. (2013).

Slides 6-11 of the Google slides will be printed and posted at the board where Number Talks will occur. These nonverbal gestures with native language supports are meant for students to reference when they are solving the problem and sharing strategies with the class. Slides 13-16 are also meant to be printed and posted for students to reference the vocabulary words that will be referenced and used throughout the routine. Slides 17-20 are also to be printed and posted, where students will be able to see and reference the sentence frames that will support their production of language to explain and defend their thinking and respectfully respond to their peers.

My hope is that my work on this project will result in a daily routine in my fourth grade mathematics classrooms that is engaging and supports all learners in their development of number sense and language proficiency in the context of mathematics. Beyond academic success, my hope is that this routine will empower students to experience an inclusive learning environment that empowers all of its members to take risks and learn from one another.