How Number Talks Support the Common Core State Standards for Mathematics

Overview

As my own mathematics teaching practice shifted from a teaching-by-telling approach to a teaching and learning philosophy built upon the principles of Piaget and Kamii, my expectations for my students also shifted. Instead of asking them to memorize procedures, I began to expect them to reason, make sense, and construct strategies built upon numerical relationships. Our classroom was transformed from a didactic, static instructional environment to one characterized by listening, reasoning, justifying, applying patterns, and communicating our conjectures and generalizations. Number talks were at the heart of this personal and classroom transformation and served as a catalyst for my students and me to begin developing the mathematical dispositions and habits of mind for learning, doing, and applying mathematics. We were utilizing the Common Core's eight Standards for Mathematical Practice—before they officially existed—to explore, investigate, analyze, and lay a foundation for reasoning with numbers.

The Common Core's Standards for Mathematical Content and Practice require us to take our students deeper and build a strong foundation:

> *These Standards are not intended to be new names for old ways of doing business. They are a call to take the next step. It is time for states to work together to build on lessons learned from two decades of standards-based reforms. It is time to recognize that these standards are not just promises to our children, but promises we intend to keep. (CCSS, 2010)*

Implementation of the Standards for Mathematical Content and Practice provides a lens with which we can examine our own practices for shifts we may need to make in our approach to teaching mathematics. Number talks are an accessible way to reach deep into and draw upon the Standards for Mathematical Content and Practice to promote numerical reasoning and mathematically powerful students.

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Number talks are firmly grounded in the dispositions and processes of the Standards for Mathematical Practice while simultaneously addressing content standards in two domains: "Operations and Algebraic Thinking" and "Number and Operations in Base Ten." The intent of *Number Talks™: Helping Children Build Mental Math and Computation Strategies* is not to teach strategies but to provide a platform for students to invent, construct, and make sense of important foundations in number. As classroom communities engage in number talks, content and practice standards are intertwined in a purposeful, intentional way that allows students a voice in their learning and understanding.

The Standards for Mathematical Practice

As we look at the Common Core's eight Standards for Mathematical Practice, we can envision how students incorporate them as they engage in classroom number talks. Throughout this resource you will find video segments highlighted to illustrate specific mathematical practices and to exhibit how classroom number talks provide a vehicle for students to develop these habits of mind for doing and learning mathematics. While the standards will be discussed as individual practices, in this resource they also are viewed as interdependent with no lines of division among them:

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1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

The Standards for Mathematical Content*

"Counting and Cardinality," "Operations and Algebraic Thinking," and "Number and Operations in Base Ten" are the key Common Core domains addressed in *Number Talks™: Helping Children Build Mental Math and Computation Strategies*. The following table outlines the CCSS domains and standards incorporated in *Number Talks™*:

Domain	Grade	Content Standard Clusters
Counting and Cardinality	**K**	Know number names and the count sequence.
		Count to tell the number of objects.
		Compare numbers.
Operations and Algebraic Thinking	**K**	Understand addition, and understand subtraction.
	1	Represent and solve problems involving addition and subtraction.
		Understand and apply properties of operations and the relationship between addition and subtraction.
		Add and subtract within 20.
		Work with addition and subtraction equations.
	2	Represent and solve problems involving addition and subtraction.
		Add and subtract within 20.
		Work with equal groups of objects to gain foundations for multiplication.
	3	Represent and solve problems involving multiplication and division.
		Understand properties of multiplication and the relationship between multiplication and division.
		Multiply and divide within 100.
		Solve problems involving the four operations, and identify and explain patterns in arithmetic.

(continued)

	4	Use the four operations with whole numbers to solve problems.
		Gain familiarity with factors and multiples.
		Generate and analyze patterns.
	5	Write and interpret numerical expressions.
		Analyze patterns and relationships.
Number and Operations in Base Ten	**K**	Work with numbers 11–19 to gain foundations for place value.
	1	Extend the counting sequence.
		Understand place value.
		Use place value understanding and properties of operations to add and subtract.
	2	Understand place value.
		Use place value understanding and properties of operations to add and subtract.
	3	Use place value understanding and properties of operations to perform multi-digit arithmetic.
	4	Generalize place value understanding for multi-digit whole numbers.
		Use place value understanding and properties of operations to perform multi-digit arithmetic.
	5	Understand the place value system.
		Perform operations with multi-digit whole numbers and with decimals to hundredths.

*National Governors Association Center for Best Practices and the Council of Chief State School Officers. 2010. *Common Core State Standards Initiative: Common Core State Standards for Mathematics*. Washington, DC. www.corestandards.org/assets/ccssi-introduction.pdf.

The purposeful progression of the standards embedded in these domains serves to aid students in building conceptual understanding and procedural fluency. One progression to carefully note is the distinction among strategies, algorithms, and the standard algorithm and how each progression is carefully designed to help students build understanding and fluency. Classroom number talks provide a collaborative forum for students to

- invent strategies;
- generalize individual strategies into personal algorithms; and
- build a conceptual bridge to the standard algorithm.

Lastly, throughout this resource you will find video segments highlighted to illustrate specific Standards for Mathematical Content and to demonstrate how number talks provide a vehicle for students to develop and utilize the core foundations of mathematics.

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