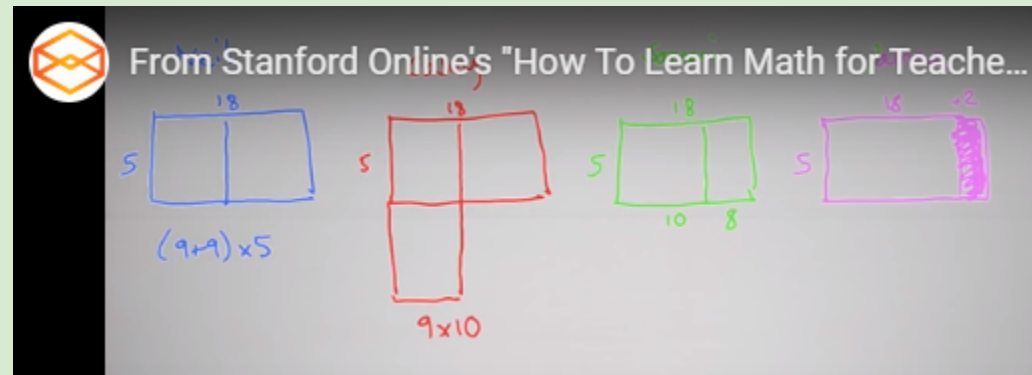


Number Talks

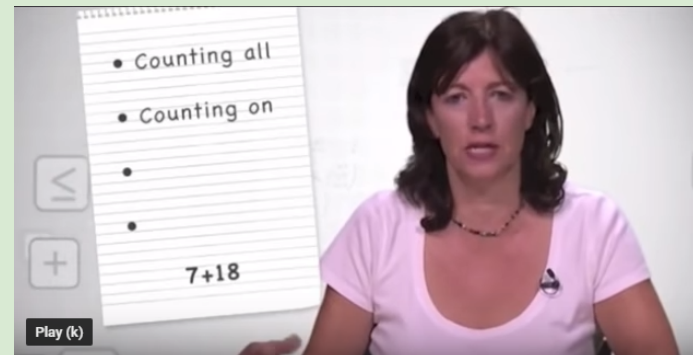
Number Talks: A 10-15 minute regular routine using intentionally crafted mathematical prompts, in which students share mental math strategies in order to build number sense and flexibility with numbers.

<u>Getting Started</u>	<u>Number Talks</u>	<u>Moving Beyond</u>
<ul style="list-style-type: none">• Why Flexibility with Numbers Matters• Setting Up Your Classroom<ul style="list-style-type: none">◦ Talk Moves• Routine Basics<ul style="list-style-type: none">◦ Hand Signals◦ Basic Flow of a Number Talk◦ Reflection Questions• Dot Images to start Number Talks	<ul style="list-style-type: none">• Number Talks vs. A Lesson• Lesson Planning Templates• Strings<ul style="list-style-type: none">◦ Dots, Images, Numbers◦ Focus on Addition, Subtraction, Multiplication and Division of Whole Numbers• Standards of Math Practices• Examples by Grade Level<ul style="list-style-type: none">◦ Video Support	<ul style="list-style-type: none">• Number Talk Pre/Post Assessments<ul style="list-style-type: none">◦ Video Support• Troubleshooting Tips• Levels of Discourse Rubric• Moving Past Whole Numbers<ul style="list-style-type: none">◦ Connecting to Fractions



What is a Number Talk?

Getting Started



Why Flexibility With Numbers Matters: Video

Setting Up Your Classroom

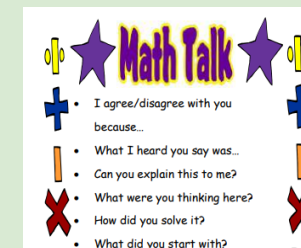
Getting Started: See Talk Moves to Support Classroom Discussions page 21 from Intentional Talk Book for more specifics.

Week 1: Focus on Revoicing and Wait Time

Week 2: Focus on Repeating and Turn and Talk

4 Week Guide to Setting Up Accountable Talk

Adapted from DUSD



Sentence Starter Bookmarks for Mathematical Discussion

Number Talks Overview

Number Talks Hand Signals



I'm thinking.



I have an answer
and a strategy!

[Number Talk Gestures English/Spanish](#)

Closing Out a Number Talk - Reflection Prompts

Can you find two strategies
that are similar?

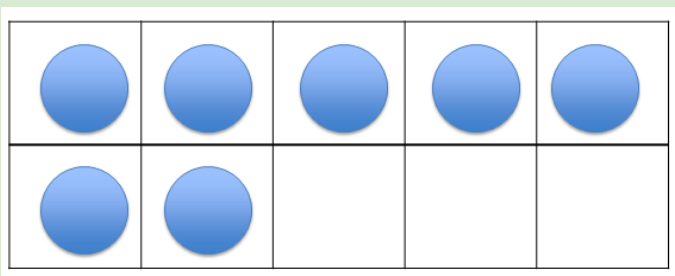
Turn and Talk to your partner
about the similarities...

Were any of the strategies
shared today confusing to you?

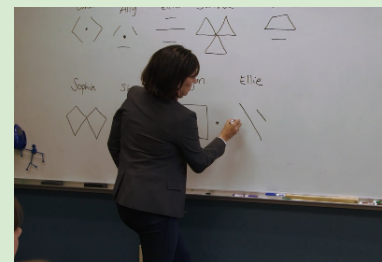
Talk to your partner about
which ones and why they were
confusing...

[Reflection Questions](#)

Dot Talks



[Dot Talks for all grade levels](#)



[Video: How to Do a Dot Talk](#)

Number Talks

Lesson Planning

Number Talks vs. A Lesson: What’s the Difference?

Number Talks:

- Students make sense of math their own way.
- Students apply what they have learned in lessons or come up with their own strategies.
- Focus is on numbers

Lesson:

- Teacher makes lesson objective clear.
- Teacher teaches strategies the students can use to access math.
- Focus can include context

Number Talk Lesson Plan 1: Elementary Sample

Grade Level: 3-5 **Unit:** Multiplication and Division

Core Math Idea: Students may be hindered in this unit because they are not yet fluent with basic addition and subtraction facts. So in this Number Talk, I will focus on adding and subtracting single and double digit numbers mentally, and specifically on the idea of **doubles plus/minus one**.

Number Talk Problem(s): 15 + 16 (First in a series, to be followed by 15 +14; 20 + 21; 22 + 23; 22 + 21

Anticipated student methods and how to represent them:

Standard algorithm (attack them in your head)

15

+16

Count on fingers:

15, 16, 17, ... 31 (use open number line to represent single jumps)

Add 10 then add six

15 + 10 = 25

25 + 6 = 31

Double 15, then add one more:

15 + 15 = 30

30 + 1 = 31


Add 10 and 10, then add 5, then add 6

10 + 10 = 20

20 + 5 = 25

25 + 6 = 31

Number Talks Planning Template



Number Strings Planning Protocol

This instructional activity asks teachers to engage a group of students in a focused exploration of computational strategies/approaches and ideas about operations. This task is designed to highlight efficient computation strategies (often but not necessarily done mentally) and an understanding of the meaning of mathematical operations. Each problem in the string is designed to build on the thinking used to solve previous problems: there are explicit connections and relationships among the problems. The task requires that teachers choose a sequence of related problems that would be productive and accessible for their students. It also requires that teachers manage engaging all students in participation, responding to student comments and questions, and choosing problems that are likely to develop certain strategies or big ideas that s/he knows are important. The task is designed so there are many mathematical ideas that can emerge. The task can used as be a springboard for the upcoming mathematical work in the lesson.

Number Talks Planning Protocol

Number Strings

Addition: Making Landmark or Friendly Numbers

When students understand that you can compensate in addition (remove a specific quantity from one addend and add that same quantity to another addend) without affecting the sum, they can begin to construct powerful mental computation strategies from this concept. Telling them that this will always work is not sufficient; they need to have opportunities to test and prove this idea. Initially, you may want to have students use manipulatives to provide proof for their ideas. Numerical fluency (composing and decomposing numbers) is a key component of this strategy.

Category 1: Making Landmark or Friendly Numbers

The following number talks are carefully designed to use numbers that are one away from a landmark or friendly number.

9 + 8

19 + 5

9 + 26

16 + 19

25 + 25

25 + 26

24 + 26

26 + 49

37 + 69

79 + 26

89 + 28

99 + 19

Kinder Number Talk Strings



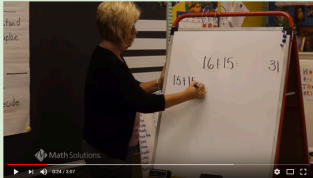
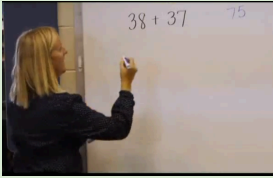

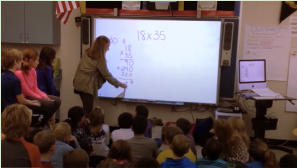
9 + 7

29 + 17

498 + 267

3.99 + 0.17

3.99 + 0.17

		Thanks to Christen Northrop with CCCOE for creating, curating and sharing this valuable resource!
Grade Level Videos		
		
TK & Kinder Dot Talks & Ten Frames		TK & Kinder Tips for Using Rekenreks that can be used in Number Talks
		
1st - 2nd Grade 16 + 15		3rd Grade 38 + 37
		
4th Grade Partial Quotients		4th - 5th 18 x 35

Moving Beyond


Number Talks

Build Numerical

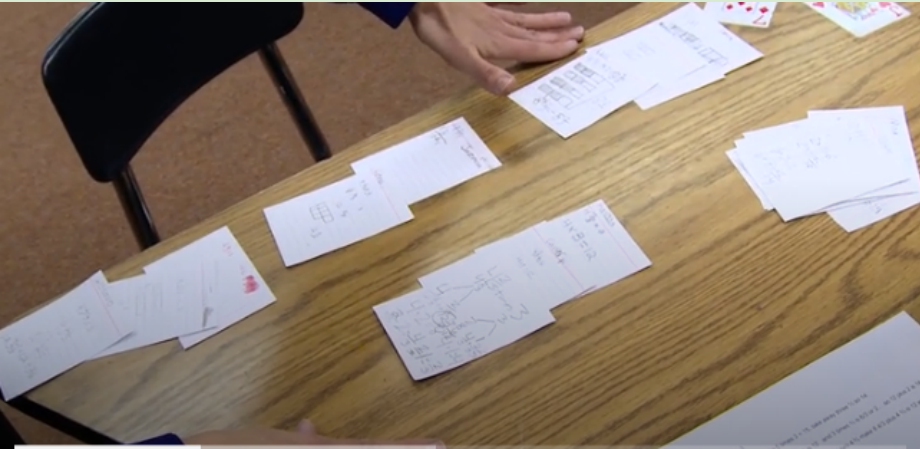
Reasoning

Strengthen accuracy, efficiency, and flexibility with these mental math and computation strategies.

By Sherry D. Parrish



How Can We Use Number Talks to Push Student Thinking?



How to Use Number Talks As Assessment

Number Talks String Recording Sheet

Date:	Goal:	Number Talk String:

Number Talks Sheet for Recording Strings for Assessment

Name: _____

Date: _____

Pre/Post

Name: _____

Date: _____

Pre/Post

K-1 Pre/Post Assessment Sheets

Name: _____

Date: _____

Pre/Post

Name: _____

Date: _____

Pre/Post

2-5 Pre/Post Assessment Sheets

Levels of Classroom Discourse				
	WHO'S ASKING THE QUESTIONS?	HOW DO I EXPLAIN MY MATH THINKING?	HOW DO I SHOW MY MATH THINKING?	AM I DOING MY JOB IN OUR MATH COMMUNITY?
Level 0	Is my teacher asking all the questions? Am I responding minimally to the question?	I respond to a question if I only know the right answer. I only explain if my teacher asks me to.	My teacher showed me a drawing to show my thinking.	I wrote my answer and idea but did not share with any classmates.
Level 1	Am I starting to think a little bit more? Am I asking any questions?	I am starting to explain my thinking rather than just my	I can make a drawing to show my math thinking.	I gave my answer. I listened to others and can restate my classmates ideas.

Levels of Discussion Matrix

Moving Past Whole Numbers

Fractions & Decimals

[Understanding Fractions](#)[Fraction Resources](#)[Fraction Models](#)[Fractions in Action](#)[Videos](#)[Fraction & Decimal Games](#)

Whole Number and Fractional Part Progression

Subitizing → Choral Counting → Counting Collections

Each concept builds on the previous idea. Students should explore and construct concepts with whole numbers and fractional parts in sequence.

Trajectory	Subitizing Being able to visually recognize a quantity of 5 or less. Perceptual: Recognizing patterns 5 or less. Categorical: Recognizing patterns 6 or more in groups of.	Comparison Being able to compare quantities by identifying which has more and which has less.	Rote Counting Rote procedure of counting. The meaning attached to counting comes through one to one correspondence.	One to One Correspondence Students can connect one number with one object and then count them with understanding.	Cardinality Tells how many things are in a set. When counting a set of objects, the last word indicates the amount for that set.	Hierarchical Inclusion Numbers are nested inside of each other. Whole Numbers: The number grows by 1 each count. 9 is inside 10 or 10 is the same as 9+1. Fractions: Students recognize that 1 is inside 1 whole and is the same as 1/1 or 1/2.	Number Conservation The number of objects remains the same when they are arranged spatially.
Number Relationships	Spatial Relationship Patterned Set Recognition Students can learn to recognize sets of objects in patterned arrangements and tell how many without counting. Whole Numbers: Subitizing Cards. Fractions: Fraction subitizing cards.	One and Two More or Less Students need to understand the relationship of number as it relates to +1/-1. Whole Numbers: Students begin to see that 5 is one more than 4 and that it is also 2 less than 7. Fractions: Students recognize that 1/2 is one-fifth more than 1/5 and one-fifth less than 3/5 or 1 whole.	How do Fractions relate to Whole Number Relationships: Spatial, One or Two More/Less, Anchors, Part-Part-Whole Relationships?		Understanding Anchors Students need to see the relationship between numbers and anchor numbers. Whole Numbers: Students anchor to 5 and 10. 3 is 2 away from 5 and 7 away from 10. Fractions: Students anchor fractional parts to one whole and equivalent fractions of 1/2.	Part-Part-Whole Subitizing Students begin to conceptualize a number of being made up of two or more parts. Fractions: Students understand that a number is made up of an infinite number of fractional parts.	

Adopted from @gflitchy.com

More information on subitizing, choral counting and counting collections with fractions can be found on the Building Number Sense page, found [here](#).

Connecting Whole Numbers to Fractions

Subtraction: Adding Up to Find the Difference

41-19	$1\frac{1}{2} - \frac{7}{8}$
$19 + \underline{\hspace{1cm}} = 41$	$\frac{7}{8} + \underline{\hspace{1cm}} = 1\frac{1}{2}$
$19 + 1 = 20$	$\frac{7}{8} + \frac{1}{8} = 1$
$20 + 21 = 41$	$1 + \frac{1}{2} = 1\frac{1}{2}$
$41 - 19 = 22$	$1\frac{1}{2} - \frac{7}{8} = \frac{5}{8}$

Subtraction: Keeping A Constant Difference

41-19	$1\frac{1}{2} - \frac{7}{8}$
$= (41 + 1) - (19 + 1)$	$= (1\frac{1}{2} + \frac{1}{8}) - (\frac{7}{8} + \frac{1}{8})$
$= 42 - 20$	$= 1\frac{3}{8} - 1$
$= 22$	$= \frac{5}{8}$

Subtraction: Part Whole Box Model

41-19	$1\frac{1}{2} - \frac{7}{8}$																				
<table><tr><td colspan="2">Whole 41</td></tr><tr><td>Part 19</td><td>Part 22</td></tr></table>	Whole 41		Part 19	Part 22	<table><tr><td colspan="2">Whole $1\frac{1}{2}$</td></tr><tr><td><table><tr><td>●</td><td>●</td></tr><tr><td>●</td><td>●</td></tr><tr><td>●</td><td>●</td></tr></table></td><td><table><tr><td>●</td><td></td></tr><tr><td>●</td><td></td></tr><tr><td>●</td><td></td></tr></table></td></tr></table>	Whole $1\frac{1}{2}$		<table><tr><td>●</td><td>●</td></tr><tr><td>●</td><td>●</td></tr><tr><td>●</td><td>●</td></tr></table>	●	●	●	●	●	●	<table><tr><td>●</td><td></td></tr><tr><td>●</td><td></td></tr><tr><td>●</td><td></td></tr></table>	●		●		●	
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Subtraction: Adjusting 1 Number to Make An Easier Number

41-19	$1\frac{1}{2} - \frac{7}{8}$
$= 41-20$	$= 1\frac{1}{2} - (\frac{7}{8} + \frac{1}{8})$
$= 21$	$= 1\frac{1}{2} - 1$
$= 21 + 1$	$= \frac{1}{2}$
$= 22$	$= \frac{1}{2} + \frac{1}{8}$

How Whole Number Strategies Work with Fractions

Troubleshooting Tips for Number Talks